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AN IN-PORT FEEDING SYSTEM FOR SHIPBOARD PERSONNEL VOLUME I

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This report contains a proposed feeding system for large classes of ships that are in-port during Ship Restricted Availability (SRA), Planned Restricted Availability (PRAV) or other overhauls. This system provides for three separate but consolidated foodservice outlets, a full service satellite A-ration outlet, fast-foodservice outlet and a vending machine service. It is envisioned that this in-port feeding system will reduce mess management specialists' labor requirements while in-port as well as improve shipboard overhaul productivity. This Report

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is volume 1 of a four-volume series. The other titles are volume 2, A Cost Benefit Analysis of the Use of Convenience Foods in a Military Foodservice Operation; volume 3, A Personnel, Equipment, and Facility Evaluation of the Enlisted Dining Facilities at NAS North Island and NAVSTA San Diego; and volume 4, Recommended Quality Control Requirements for a Central Military Food Service System.

SUMMARY

This report contains a proposed feeding system for large classes of ships that are in port during Ship Restricted Availability (SRA), Planned Restricted Availability (PRAV) or other overhauls. The major objective of this project was to reduce shipboard foodservice labor requirements during SRA/PRAV. In order to satisfy the objective, convenience-type foods, which would decrease Mess Management Specialists (MS) labor requirements, were tested and evaluated to determine customer and MS acceptability. The majority of test items demonstrated their potential for use in this proposed foodservice system. This system provides for three separate but consolidated foodservice outlets; a full service satellite A-ration outlet relying heavily on preprepared convenience foods, a modular fast food/service outlet including facility and equipment description/menu concept and a vending machine service. It is envisioned that this in-port feeding system will reduce MS labor requirements while in port as well as improve shipboard overhaul productivity.

Further study conducted under an Intergovernmental Personnel Act (IPA) investigated the potential of utilizing existing dining facilities to support satellite foodservice outlets on or near the pier area. It was determined that the dining facilities selected for the analysis have sufficient foodservice equipment and facility capacity to support these outlets. However, this alternative does require additional foodservice labor and may necessitate the utilization of shipboard foodservice personnel while in port (see series Volume 3, NATICK/TR–83/037). In conjunction with the personnel, equipment, and facility evaluation, an analysis was conducted under a second IPA to identify and develop appropriate quality control requirements necessary to support both the central food preparation facility and satellite outlets, (series Volume 4, NATICK/TR–83/038).

Finally, a cost/benefit analysis of the existing conventional in-port foodservice operations for the USS Alamo and USS Kitty Hawk and one that incorporates a large percentage of convenience foods was conducted under a third IPA. A 21-day A-ration menu cycle was designed for optimum use of convenience food for Navy in-port feeding. The menu was used to compare direct food and labor costs for the convenience food system versus the current conventional system. Daily food costs for the convenience food system averaged $3.14 versus $3.03 for the conventional system. Direct labor cost analysis based on monthly computation showed a labor cost reduction with the use of convenience food of 33.6 percent and 56.5 percent for the USS Alamo and USS Kitty Hawk, respectively (series Volume 2, NATICK/TR–83/036).

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PREFACE

During FY80 to FY82 the Operations Research and Systems Analysis Office at the US Army Natick Research and Development Laboratories (NLABS) conducted an investigation of the Navy in-port feeding system under Task AA, Project 1L162724AH99A, Analysis and Design of Military Feeding Systems, of the DoD Food Research Development Testing and Engineering Program. The military service requirement identification was USN 9–2 In-port Feeding Systems for Shipboard Personnel. The purpose of this project was to develop and evaluate analytically alternative foodservice system concepts for providing meals to surface ship crew members during extended in-port periods. In particular, a system was desired to reduce onboard foodservice personnel labor requirements to provide the cooks time for leave, liberty, and training comparable with that enjoyed by other members of the crew, and, secondly, to reduce the loss of ships' force overhaul productivity resulting from messing delays. In addition, the proposed system was to provide highly acceptable and nutritious meals at a quality level that was equal to or better than that presently being served to shipboard personnel while in port.

The initial analytical effort was conducted at Naval Air Station (NAS) North Island, CA, and Naval Station (NAVSTA) San Diego, CA, during fiscal 4Q80 and 1Q81. The emphasis during this time period was on defining the system of in-port feeding utilized in both the larger and smaller ship classes. It soon became apparent that a formally structured in-port feeding system was nonexistent and that the need for one was more prevalent to support the larger classes of ship in port. Thus, the investigation focused on potential solutions for aircraft carriers.

In order to accomplish this task, the service and expertise of many people were necessary. Specifically, the authors would like to thank the Navy Food Service Systems Office (NAVFSSO) for defining broad objectives and reviewing proposed project plans. We also wish to express our appreciation to Commander A. McKechnie, Lt. Jones, and MSCM Struthers assigned to the staff of Commander, Naval Air Forces, US Pacific Fleet (COMNAVAIRPAC), Lt. M. Halloran assigned to staff of Commander Naval Surface Ships, US Pacific Fleet (COMNAVSURPAC), the West Coast Navy Food Management Team and the staff of the US Naval Supply Center, San Diego, CA for their cooperation and support throughout the study; Mr. Joseph W. Szczeblowski of the Food Engineering Laboratory, NLABS, for his guidance in ensuring proper handling of the Tray Packs; Dr. Herbert Meiselman, Head, Behavorial Science Division, Science and Advanced Technology Laboratory, for developing the customer and foodservice worker questionnaires and surveys used in this project; and Ms. Barbara Bell and Mr. Joe Hunn also of the Behavioral Science Division who devoted many hours in conducting the consumer and mess specialist surveys.

As in the case of any research and development system project of such broad scope, appreciation is due other Natick Laboratories personnel. These include Dr. Robert J. Byrne in his former capacity as Chief, Operations Research and Systems Analysis Office (now Technical Director, US Army Natick Research and Development Laboratories); Mr. R. P. Richardson in his former capacity as Program Manager, Operations Research and Systems Analysis Office (now Special Assistant for Planning and Program Evaluation, US Army Natick Research and

Development Laboratories); and Mr. Robert J. Walsh, Program Manager, Operations Research and Systems Analysis Office (OR/SAO) for their overall technical guidance, encouragement, and support. The authors wish to extend a special thanks to Mr. Philip Brandler, Chief, OR/SAO for his direction and assistance in completing this report. Acknowledgement is also given to Mrs. Cheryl Stoops for her efforts in secretarial support of the project.

Because the information in this report refers to United States installations and feeding systems only, United States customary units rather than metric are used throughout.

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I. INTRODUCTION

There presently exists in the Navy a need to reduce onboard labor requirements for foodservice personnel (mess management specialists and foodservicemen) when the ships are in port during ship restricted availability (SRA), planned restricted availability (PRAV) or other overhauls, during maximum leave/liberty period and during regular operating periods. The purposes for reducing foodservice staffing levels and/or required man-hours when ships are in-port is to free personnel for other priority tasks (such as training) that are normally required during such periods, and to provide time for leave and liberty comparable with that enjoyed by other members of the crew.

In consonance with these objectives, the Chief of Naval Operations (CNO) has created a task group to investigate methods for improving quality of life for enlisted personnel onboard ships, primarily through reducing workloads. In addition, the CNO feels that some enlisted dining facilities (EDFs) ashore have periodically become severely overcrowded due to the requirements to provide foodservice to crews of ships in overhaul while meeting the facilities' normal messing requirements. Therefore, corrective action is necessary in order to reduce both crew dissatisfaction as well as the collective loss of ships' force overhaul productivity resulting from messing delays. These messing delays are due not only to overcrowding at the ashore EDF but also due to the fact that shipboard personnel while in-port must be bussed to the ashore EDF at a substantial loss of working time (estimated loss is one hour per person for lunch). The in-port feeding project therefore is consistent with broad Navy goals.

II. DEFINITION AND ANALYSIS OF EXISTING IN–PORT FOODSERVICE SYSTEMS

The preliminary analysis soon indicated that there was no universally accepted or formally structured foodservice system for the various sizes of ships while in SRA or PRAV. The foodservice system was primarily designated by the individual commanding officers of ships in-port and was based on their personal preferences and/or perceived requirements. These alternatives included:

- Enlisted dining facilities ashore
- Vending system
- Mobile unit (cold truck)
- Ship's galley (own)
- Ship's galley (other)
- Tenders
- Barges

Initial investigations of each foodservice system alternative revealed a number of negative aspects that hampered efficient foodservice operations while in-port. These negative operational characteristics are listed below.

1. **Enlisted dining facilities (EDF) ashore.** The majority of ashore EDFs are a substantial distance from the pier area, necessitating the transportation of shipboard personnel, which results in a loss of ship's overhaul productivity while in-port. In addition, this influx of shipboard personnel at these facilities results in severe overcrowding and disrupts normal operations. Further, the transportation of shipboard personnel to an ashore EDF for meals does not eliminate the requirement for shipboard foodservice labor. Mess Management Specialist (MSs) assigned to ships utilizing the ashore EDF must report to that EDF to assist in meal preparation.

2. **Vending system.** Some negative aspects encountered with the vending operations included lack of adequate variety as well as marginal quality. In addition, runouts of high-preference food items were common. Mechanical breakdowns, the impersonal nature of a vending system, as well as the montony (i.e., type of service, food) were also identified.

3. **Mobile unit (cold truck).** Because of their limited serving capability (150 to 250) frequent resupply is necessary with these units unless the crew size is small. This drawback becomes critical when one considers the large in-port crew sizes (1,900 to 2,200) of ships such as aircraft carriers. The constraint on the number of customers that can be served further implies that the types and variety of foods available are limited as well.

4. **Ship's galley (own).** In many instances when ships are in-port, their galleys and mess decks are undergoing repairs and renovations. This industrial environment is not conducive to efficient food preparation or dining and leads to customer dissatisfaction. In addition, using the assigned ship's mess deck does not offer the crewmember a "change of scene" when in-port. Furthermore, menus may be somewhat limited because of the nonavailability of foodservice equipment which is being repaired or replaced.

5. **Ship's galley (other).** This alternative is primarily available to smaller ships. All smaller ships in-port are not simultaneously undergoing repair and renovation of their galleys and messdecks, thus comparable foodservice support is often available. Because of the small crew sizes, disruption of normal messing operations of other ships providing foodservice support is minimal. When a carrier is in port a smaller ship can not provide the foodservice support required for carrier-sized crews.

6. **Tenders and barges.** Tenders and barges could supply foodservice support to smaller ships. However, because of limited capacity, tenders and barges, are not able to support shipboard personnel from aircraft carriers. Furthermore, discussions with the Naval Sea Systems Command (NAVSEA) indicated that barges are in limited supply especially for foodservice applications.

It is apparent that classes of smaller ships (e.g., fast frigates, destroyers and LSTs) have available to them a greater number of feeding alternatives while in port undergoing SRA or PRAV. For smaller ships, foodservice can be provided by mobile units, barges and tenders, or other ships' galleys. The positive attributes of these alternatives are as follows:

1. The mobile unit requires no shipboard MS labor, can offer an acceptable fast-service/food concept, operates with low food costs and can be located in close proximity to the ship.

2. Barges and tenders can offer A-ration meals with adequate variety and nutrition, can be located in close proximity to the ship and, although the change of environment may be minimal, they do remove personnel from the ship.

3. Utilizing the mess decks of other ships in port eliminates the need to operate the assigned ship's mess during overhaul periods as well as enables A-ration meals to be offered; the location at the same pier area reduces the collective loss in overhaul productivity due to messing delays.

Therefore, because the need was more prevalent within the classes of larger ships, the primary thrust of the project was toward addressing concepts to alleviate problems associated with feeding carrier shipboard personnel while in port.

III. FOODSERVICE ALTERNATIVES FOR AIRCRAFT CARRIER PERSONNEL WHILE IN–PORT

The investigators' analysis identified several possible alternative foodservice concepts for in-port feeding of carrier personnel. These concepts included utilizing the existing ship's galley, the ashore EDF, a modular fast-foodservice facility, a satellite feeding facility, and a vending machine service. The positive and negative attributes of each of these foodservice alternatives are provided below. The attributes were identified by comparing the details of each type of operation with the objectives of decreasing foodservice labor and the collective loss of ship's overhaul productivity due to messing delays while providing acceptable quality foodservice.

A. Existing Ship's Galley

The primary advantage of this alternative is one of location. There would be no loss of ship's overhaul productivity due to the fact that the crewmembers would not have to leave the ship. In addition, if the galley itself were not under repair and utilities were uninterrupted, the galley would continue to produce a variety of nutritious A-ration meals, as it would underway. However, this option does not allow for any reduction of shipboard foodservice labor requirements. Further, in many cases, while ships are in-port, galley and mess decks are undergoing renovation, or utilities are shut down. Therefore, either foodservice aboard is totally precluded or personnel are exposed to a hazardous industrial environment, which leads to disruptions in messdeck operations as well as customer dissatisfaction.

B. Enlisted Dining Facility Ashore

Because of the capabilities of ashore enlisted dining facilities to produce and prepare A-ration meals, this option offers a wide variety of acceptable, nutritious meals. The principal drawback is that the majority of existing EDFs ashore are a substantial distance from the pier area, requiring transportation of shipboard personnel. This need for transportation to and fro results in messing delays and loss of shipboard overhaul productivity and, because of overcrowding and fluctuations in headcount, a disruption of normal EDF activity. These drawbacks could be overcome by constructing a designated EDF for shipboard personnel close to the pier area and enhancing the operation by implementing new food concepts to reduce foodservice labor requirements. Naturally, the construction of any type of facility is a relatively expensive proposition. Further, it would be expected that ship foodservice workers would staff these facilities or help at existing facilities shared with shore personnel.

C. Satellite Facilities

Satellite facilities serving preprepared foods provided by a central food preparation facility (an ashore EDF) can be located on or near the pier area. Further, staffing levels for these facilities would be minimal because the foods (preprepared and frozen) to be offered at these outlets require only to be heated and served. The potential of utilizing semiskilled foodservice personnel rather than highly trained cooks to perform this task should not be overlooked as well. It should be noted that the modest staffing requirements at the satellite may be offset to some degree by the need for ship foodservice personnel to assist at the central food preparation facility.

The logistics involved in operating a satellite facility are more complex than some of the other alternatives. The transportation of frozen-food products from the central food preparation facility to the satellite outlets and monitoring of inventory to ensure adequate supplies would have to be closely controlled. Furthermore, the ability of existing ashore EDFs to support satellite facilities would have to be determined for each base. To better analyze this alternative, an investigation was conducted under an Inter-Governmental Personnel Agreement (IPA) between the University of Nevada, Las Vegas and the US Army Natick Research and Development Laboratories (NLABS).

For the analysis EDFs at two potential sites were selected. Specifically, dining facilities located at Naval Air Station (NAS) North Island and Naval Station (NAVSTA) San Diego were investigated to determine their capability and capacity to preprocess foods for satellite feeding operations. Personnel requirements, equipment capacity and the facilities were evaluated to determine the maximum feasible output of the EDF with a minimum of new equipment and facility changes. In both cases it was envisioned that the processed foods would be trucked from the EDF to onshore satellite foodservice areas or directly to in-port ships for the plating and serving of meals. A carrier was used as an example for the EDF at North Island. It was determined that both EDF NAVSTA San Diego and EDF NAS North Island have equipment and facility capacity to produce additional meals if additional employees are provided for each satellite facility (see Volume 3 in this series, A Personnel, Equipment, and Facility Evaluation

of the Enlisted Dining Facilities at NAS North Island and NAVSTA San Diego, by Frank D. Borsenik, NATICK/TR–83/037). This requirement for additional employees to support the satellite feeding facilities may, as mentioned before, necessiate the utilization of shipboard foodservice personnel while in-port.

In conjunction with the personnel equipment and facility evaluation conducted by the University of Nevada, an analysis was done under a second IPA between the San Diego State University, California, and NLABS. The purpose of this segment of the analysis was to determine the appropriate quality control requirements needed to support a proposed US Navy military foodservice system in San Diego where products are prepared centrally and distributed to remote locations for heating, serving and consumption. The quality control system developed ensures that foods produced and consumed are of high nutritional and sensory quality as well as safe from pathogenic foodborne microorganisms. This work is described in Volume 4 of this series, Recommended Quality Control Requirements for a Central Military Food Service System, by Ronald Josephson and Bonnie Sattler, NATICK/TR–83/038.

D. Modular Fast-Foodservice Facility

A modular unit permits a great deal of flexibility in regard to location. It can be constructed in close proximity to the pier area, reducing the time shipboard personnel are away from their respective ships. In addition, the number of carrier shipboard personnel required to operate such a unit is minimal. Further, the modular unit offers a proven fast-foodservice concept.[1,2,3] Relatively large capital investment for units such as this should be anticipated.

E. Vending Operations

This alternative, as was the case with utilizing existing galleys, would eliminate the need for shipboard personnel to leave the ship. This option offers foodservice to duty section personnel who cannot leave the ship due to assigned watches. Because the vending units would be accessible 24 hours a day, they would also provide foodservice for mid-rations (MIDRATS)

[1] R.P. Richardson, D.P. Leitch, B.M. Hill, P.M. Short, and G. Turk. A New Foodservice System Concept for Aircraft Carriers. NATICK/TR–80/007, US Army Natick Research and Development Laboratories, 1979 (AD A083 630).

[2] B.M. Hill, J. Ahern, M. Ostrowsky, G. Turk, B. Bell, L. Symington, and D.P. Leitch. A Fast Service Concept for Army Dining Facilities, NATICK/TR–82/035, Natick, MA, US Army Natick Research and Development Laboratories, 1982;

[3] B.M. Hill, M. Ostrowsky, J. Ahern, and G. Turk. A Fast Service Concept Utilizing a Modular Food Facility. NATICK/TR–82/038, Natick, MA, US Army Natick Research and Development Laboratories, 1982.

requirements. Further, as this service would probably be provided under contract, it would require no shipboard MS labor. Provisions have to be made in the contract to minimize runouts, to ensure quality and prevent mechanical problems.

The conclusion drawn from the consideration of the viable alternatives was that any one option could not efficiently support the foodservice requirements for aircraft carriers while in port. Therefore, the investigators considered a proposal that combined foodservice concepts and facilities. The following section describes further efforts conducted to evaluate some particular products for their suitability for incorporation into the ultimate concept under development.

IV. EVALUATION OF NEW FOOD PRODUCTS FOR IN–PORT FEEDING

In order to reduce shipboard foodservice labor, convenience-type foods (shelf-stable, frozen, dehydrated) were tested and evaluated to determine customer and MS acceptability. This test was conducted onboard the USS Kitty Hawk (CV–63) NAS North Island and USS Alamo (LSD–33), NAS San Diego. In addition, surveys were simultaneously administered to consumer and MSs to obtain attitude and preference data toward foodservice during these in-port periods.

A. Evaluation of Convenience Foods

This segment of the in-port feeding project was devoted to an evaluation of the acceptability of convenience foods from both customer (i.e., enlisted personnel) and worker (i.e., MSs) viewpoints in order to determine the extent to which such items could be incorporated in a proposed concept. Test menus, each of a two-week duration, were designed, one for each ship (Appendix A). These menus utilized convenience foods (both frozen and shelf stable) that were either fully prepared (e.g., entrees such as lasagna) or partially prepared (e.g., dehydrated potatoes, cake mixes, etc.). One of the types of the prepared convenience foods evaluated were Tray Packs which are thermally processed, shelf-stable foods in half size steamtable containers. In order to offer menus that contained adequate variety, these products were supplemented with non-labor intensive conventional items obtained from the Armed Forces Recipe Service. The following tables (1 through 4) provide the results of the convenience foods test. In order to evaluate quantitatively customer preferences, a hedonic scale (as shown below) ranging from one (dislike extremely) through nine (like extremely) was utilized.

HEDONIC SCALE

1	Dislike extremely
2	Dislike very much
3	Dislike moderately
4	Dislike slightly
5	Neither like nor dislike
6	Like slightly
7	Like moderately
8	Like very much
9	Like extremely

1. **Customer Acceptance.** If we establish an acceptability cutoff point at 6.0, (like slightly), 62% of the Tray Pack items tested onboard the USS Kitty Hawk were well accepted. Nevertheless, Tray Pack items receiving mean hedonic ratings below 6.0 were found in all four categories: entrees, vegetables, potatoes and starches, and desserts. However, all of these items scored between "neither like nor dislike" (5) and "like slightly" (6) indicating that none of the Tray Pack items were actively rejected as unacceptable.

Table 1

USS Kitty Hawk food acceptance: Tray Packs

	N	Mean Hedonic Rating
Entrees		
Chicken Cacciatore	19	6.84
Stuffed Cabbage	23	6.65
Beef Stew	46	6.63
Sliced Pork with Gravy	38	6.45
Chipped Beef	32	6.34
Sliced Roast Beef	22	6.32
Chili	24	6.29
Stuffed Green Peppers	21	6.24
Macaroni and Beef	18	5.50
Beef Burgundy	25	5.16
Vegetables		
Home Baked Beans	22	5.54
Potatoes and Starches		
Macaroni and Cheese	41	6.37
German Potato Salad	30	5.80
Scalloped Potatoes with Ham	26	5.73
Desserts		
Apple Crunch	20	7.35
Cherry Crunch	38	5.53

In regard to the frozen convenience foods evaluated onboard the USS Kitty Hawk (Table 2), 85% of the items tested were rated above 6.0. It should be noted that only one of the 13 frozen dessert items tested received a rating below 7.0 (lemon crunch, 6.52). Further, only one item scored in the region of active dislike (parsley buttered potatoes). All of the rest scored at a minimum between "neither like nor dislike" and "like slightly."

Table 2

USS Kitty Hawk food acceptance: frozen/dehydrated

	N	Mean Hedonic Rating
Entrees		
Beef in Barbeque Sauce	30	7.13
Sliced Pork with Gravy	24	7.12
Sliced Roast Beef with Gravy	30	7.03
Baked Stuffed Shells and Spaghetti Sauce (CN)	47	6.81
Chicken A La King	23	6.70
Grilled Steak (Reformed)	66	6.58
Salisbury Steak	31	6.58
Swedish Meatballs	31	6.48
Pork Chop Suey	14	6.43
Spaghetti with Meatballs and Sauce (FZ)	19	6.42
Baked Lasagne	42	6.38
Stuffed Green Peppers	18	6.22
Beef Stew	25	6.12
Sloppy Joe	20	6.10
Beef Tips with Gravy	17	6.06
Cheese Ravoli (FZ) with Spaghetti Sauce (CN)	43	5.91
Burritos	26	5.58
Veal Parmesan	21	5.48
Enchilladas	26	5.27
Potatoes/Starches		
Macaroni and Cheese	38	6.66
Parsley Buttered Potatoes	36	4.06
Desserts		
Cheesecake	22	8.18
Apple Pie	18	8.00
German Chocolate Cake with Frosting	17	7.94
Carrot Cake	21	7.90
Blueberry Pie	21	7.90
Coconut Cake with Frosting	16	7.88
Dutch Apple Pie	42	7.84
Banana Cake with Frosting	22	7.82
Devil's Food Cake with Chocolate Frosting	39	7.74
Strawberry Rhubarb Pie	14	7.71
Chocolate Brownies	20	7.40
Pecan Pie	24	7.44
Lemon Crunch	28	6.52
Dehydrated		
Au Gratin Potatoes	81	6.59
Scalloped Potatoes	27	5.41
Carrot Cake Mix	12	7.75

The evaluation of Tray Pack items conducted onboard USS Alamo (Table 3) revealed that 60% of the tested Tray Packs were well accepted. Tray Pack products receiving a mean hedonic rating below 6.0 were found in the entree, vegetable and starch category and two potato items scored in the region of active dislike.

Table 3

USS Alamo food acceptance: Tray Pack

	N	Mean Hedonic Rating
Entrees		
Stuffed Peppers	28	7.58
Chili	35	7.43
Chicken Pot Pie	24	7.38
Beef Tips with Gravy	21	7.24
Sloppy Joe	27	7.15
Stuffed Cabbage	12	7.00
Chicken Cacciatore	12	7.00
Chicken Breasts in Sauce	22	6.65
Chicken A La King	25	6.24
Salisbury Steak	32	6.00
Baked Lasagna	29	6.00
Cheese Ravioli	21	5.76
Roast Beef	36	5.56
Vegetables		
Home Baked Beans	11	5.82
Potato and Starches		
Macaroni and Cheese	18	5.48
Scalloped Potatoes	55	4.98
German Potato Salad	26	4.46
Desserts		
Apple Crisp	7	7.86
Cherry Crisp	13	7.56

In regards to the frozen convenience foods evaluated onboard the USS Alamo (Table 4), 85% of the items tested were rated above 6.0. It should be noted that every frozen dessert item tested received a rating which exceeded 7.25, and only one item (seafood newburg) scored in the region of active dislike.

Table 4

USS Alamo food acceptance: frozen

	N	Mean Hedonic Rating
Entrees		
Tuna Noodle Casserole	8	7.62
Beef Tips with Gravy	15	7.53
Beef Stew	22	7.41
Salisbury Steak	21	7.29
Chicken A La King	29	6.86
Grilled Steak (Reformed)	33	6.85
Pork Chop Suey	17	6.76
Macaroni and Beef	25	6.72
Sliced Pork	28	6.36
Cheese Ravioli	20	6.35
Beef BBQ	25	6.28
Swiss Steak	38	6.24
Enchiladas	19	6.10
Turkey	16	5.94
Burritos	29	5.79
Stuffed Shells	45	5.69
Swedish Meatball	20	5.65
Baked Lasagna	35	5.48
Seafood Newburg	16	4.00
Potato and Starches		
Macaroni and Cheese	17	6.12
Desserts		
Coconut Cake	15	8.67
German Chocolate Cake	11	8.55
Devil's Food Cake	23	8.37
Boston Cream Pie	12	8.25
Strawberry Shortcake	22	8.01
Dutch Apple Pie	19	8.00
Peach Pie	10	8.00
Blueberry Pie	15	7.90
Carrot Cake	16	7.88
Chocolate Brownies	15	7.86
Cheesecake	23	7.88
Pumpkin Pie	17	7.78
Apple Pie	12	7.67
Strawberry Rhubarb Pie	14	7.57
Lemon Meringue Pie	25	7.48
Lemon Crunch	15	7.35
Chocolate Cream Pie	23	7.26

2. **Mess Management Specialist Acceptance.** In general the convenience foods tested onboard the USS Kitty Hawk and the USS Alamo were very well accepted. Results of interviews conducted with MSs pertaining to their attitudes towards the convenience food indicated that not only did they reduce preparation time and clean-up but the selections were extremely acceptable as well.

Items such as the thaw and serve desserts, which were extremely acceptable from a customer's standpoint, required virtually no labor other than slicing and serving. Some problems identified by MSs interviewed concerned packaging and handling of convenience items. Problem areas mentioned most often were the following four.

a. The Tray Pack containers provided too few servings per insert. For example, with headcounts onboard the USS Kitty Hawk as high as 900 for lunch, constant replenishment of the serving line was necessary, which resulted in excessive messing delays.

b. When Tray Packs were heated in steam jacketed kettles workers experienced difficulties taking out and opening the heated products.

c. The aluminum, full-sized steamtable trays that held many of the frozen products (e.g., sliced pork) were awkward and fragile, resulting in excessive spillage. Many full-sized aluminum steamtable trays were crushed in handling and therefore had to be reformed before being inserted into ovens.

d. The "boil in bag" products tested (e.g., swedish meatballs) were totally unacceptable in regard to packaging and handling. Approximately 28% of the boil in bags heated in the steam-jacketed kettle had punctures or developed seal leaks. As was the case with Tray Packs, removing these items from the steam jacketed kettles after heating proved very difficult.

It must be noted that these packaging and handling difficulties were encountered in only a small number of total convenience items tested. The majority of test items demonstrated their potential for use in a proposed foodservice system by reducing MS shipboard labor while maintaining food quality.

3. **Comparative Analysis.** A comparative analysis (cost, acceptability) was conducted between Tray Pack and frozen entrees in those cases where like items were evaluated (Table 5). In each case the cost per portion of the Tray Pack entrees exceeded that of their frozen counterparts. The additional cost per portion with the Tray Pack items ranged from 15% higher in the case of macaroni and cheese to 64% higher in the case of sloppy joe. In addition, only two of the ten Tray Packs compared were considered more acceptable than their frozen counterparts, one of which was the sloppy joe (64% more expensive). Therefore, because of the higher cost per portion of Tray Packs and the overall comparable acceptability between frozen and Tray Pack items, frozen items were selected as being more cost beneficial for consideration as part of a convenience food concept. It is important to note that the high cost of Tray Packs in comparison to frozen convenience foods may be largely attributed to their low production base. As the demand for Tray Pack products increases and the production base grows, price reductions should be realized through economies of scale, and Tray Packs may prove more desirable than frozen items.

Table 5

A comparative cost analysis between
Tray Pack and Frozen entrees

Item	Cost/Serving Fzn	TP Cost/Serving Increase Over Fzn[a,b]	Acceptability: TP to Fzn[b]
Stuffed Peppers	$0.55	16	More acceptable
Sloppy Joe	.45	64	More acceptable
Lasagna	.51	51	Comparable
Beef Stew	.75	32	Comparable
Sl. Pork w/Gravy	.86	53	Comparable
Macaroni and Cheese	.27	15	Comparable
Chicken A La King	.54	44	Less acceptable
Sl. Roast Beef w/Gravy	.94	46	Less acceptable
Macaroni and Beef	.42	38	Less acceptable
Salisbury Steak	.52	62	Less acceptable

[a]Not included are energy costs of frozen storage.

[b]If the difference in the mean hedonic ratings between items as ± .05 then the Tray Pack was judged comparable to the frozen counterpart; if ≥0.5 then more acceptable; if ≤0.5 then less acceptable.

B. Attitude Surveys

Consumer and foodservice worker (MS) attitude surveys pertaining to in-port, periods conducted on the USS Kitty Hawk were aimed at evaluating a recent ship restricted availability (SRA) period when (1) both galleys were shut down (2) all enlisted personnel were placed on commuted rations (COMRATS) and (3) personnel were shuttled to the ashore EDF for meals. Surveys conducted onboard the USS Alamo addressed attitudes regarding its recent planned restricted availability (PRAV).

A substantial number of personnel (68%) stay onboard both ships during extended in-port periods (Table 6), all of which had to be fed. In addition, only an 11% decrease in onboard personnel from weekday to weekend was identified.

Table 6

Percentages and frequencies of personnel that live on or off the ship during the PRAV/SRA

	Total		USS Kitty Hawk		USS Alamo	
	%	Count	%	Count	%	Count
Weekdays	68	113	65	62	72	51
	32	54	35	34	28	50
	N = 167		N = 96		N = 71	
Weekends	57	93	58	55	56	38
	43	70	42	40	44	30
	N = 163		N = 95		N = 68	

The majority of shipboard personnel were utilizing foodservice facilities onboard for breakfast, lunch, dinner (Table 7); however when asked where they would prefer to eat each of the three meals, an overwhelming majority preferred to eat their meals ashore.

When asked to rank order their preference for three food systems, the majority (63%) selected the A-ration as their first choice and short order and takeout as their second and third choices, respectively (Table 8).

When MSs were asked how additional free time, if given, would be spent, the majority (56%) felt that this free time would be utilized for additional training (Table 9).

In summary, the following findings from surveys administered to both customers and MSs were considered in the design of the new foodservice concept for in-port feeding.

1. The majority of shipboard personnel remain on or with the ship during in-port periods and require some sort of foodservice support. This support is required on weekends as well as weekdays.

2. The majority of crewmembers currently utilize foodservice facilities onboard for all three meals but would prefer to enjoy their meals away from the ship.

3. The order of preference for foodservice systems is A-ration, short order and takeout.

4. MSs believe that additional free time resulting from a reduction of foodservice labor requirements while in-port would be utilized for more training, rather than for more cooking

Table 7

Survey of personnel utilizing onboard foodservice facilities

	Total Sample			USS Kitty Hawk			USS Alamo		
People Who	%	Count	N	%	Count	N	%	Count	N
Are Single	73.2	142	194	73.9	85	115	72.2	57	79
Are on First PRAV	82.0	137	167	77.1	74	96	88.7	63	71
Are on COMRATS	50.9	88	173	40.4	40	99	64.9	48	74
Are Now Eating									
Breakfast Aboard	65.6	103	157	63.1	53	84	68.5	50	73
Lunch Aboard	71.6	134	187	65.8	73	111	80.2	61	76
Dinner Aboard	54.3	101	186	50.4	55	109	59.7	46	77
Would Prefer to Eat Breakfast									
Onboard	25.3	45	178	19.0	19	100	33.3	26	78
On Pier	5.1	9	178	7.0	7	100	2.5	2	78
Ashore	67.4	120	178	71.0	71	100	62.8	49	78
Barge	2.2	4	178	3.0	3	100	1.0	1	78
Lunch									
Onboard	20.3	39	192	11.4	13	114	33.3	26	78
On Pier	8.8	17	192	12.2	14	114	3.8	3	78
Ashore	68.7	132	192	73.6	84	114	61.5	48	78
Barge	2.1	4	192	2.6	3	114	1.3	1	78
Dinner									
Onboard	19.3	37	192	11.4	13	114	30.7	24	78
On Pier	6.8	13	192	9.6	11	114	2.5	2	78
Ashore	71.4	137	192	75.4	86	114	65.4	51	78
Barge	2.6	5	192	3.5	4	114	1.3	1	78

Table 8

Rank ordering of food systems

	Total		USS Kitty Hawk		USS Alamo	
	%	Count	%	Count	%	Count
A-ration	N = 193		N = 115		N = 78	
1st Choice	63.7	123	71.3	82	52.5	41
2nd Choice	16.1	31	11.3	13	23.1	18
3rd Choice	20.2	39	17.4	20	24.4	19
Short Order	N = 193		N = 115		N = 78	
1st Choice	24.3	47	16.5	19	35.9	28
2nd Choice	49.2	95	51.3	59	46.2	36
3rd Choice	26.4	51	32.2	37	17.9	14
Takeout	N = 193		N = 115		N = 78	
1st Choice	11.9	23	12.2	14	11.5	9
2nd Choice	34.7	67	37.4	43	30.7	24
3rd Choice	53.4	103	50.4	58	57.7	45

Table 9

Survey of possible utilization of potential free time

MSs: Free time would result in:	Total		USS Kitty Hawk		USS Alamo	
	%	Count	%	Count	%	Count
More cooking	11.11	3	6.25	1	18.19	2
More liberty	11.11	3	12.50	2	9.09	1
More training	55.56	15	68.75	11	36.36	4
Other	22.22	6	12.50	2	36.36	4
	N = 27		N = 16		N = 11	

(more than one response allowed per question)

or additional liberty. This finding is significant in that discussions with high ranking Mess Management Specialists and Navy Food Management Team members indicated they have identified advanced training for MSs while in-port as deficient.

V. PROPOSED IN-PORT FEEDING SYSTEM

A. Overall System Description

The basic objective of any proposed foodservice concept for in-port feeding should be to provide conveniently located facilities near the ships. The facilities should offer diverse, highly acceptable menus utilizing a number of easily prepared food products and thus permit a reduction in foodservice labor requirements during these periods. In addition, any dining concept should offer an environment that represents an improvement over that found onboard ship during most overhaul situations.

As stated earlier in this report, it was felt that any one foodservice alternative could not support the requirements for carrier personnel while in port yet satisfy these aforementioned objectives. Therefore, a concept that drew upon the positive attributes of three foodservice alternatives was developed. These three alternatives were a full-service satellite A-ration outlet relying heavily on the use of convenience foods, a modular outlet providing fast foodservice, and a vending machine service located on the hangar deck of the carrier. While the primary thrust of this project was to develop a new foodservice system to support carrier personnel during extended in-port periods, the two ashore facilities – A-ration and modular fast-food outlets – could be utilized by other ships (e.g., ammunition ships (AES), fast combat support ships (AOES)) in similar situations.

1. **Full Service Satellite A-ration Outlet.** This outlet would offer a high-preference, cyclic A-ration menu that is strongly dependent both on convenience foods that are readily available from the Defense Personnel Support Center (DPSC) and commercial sources, as well as low-labor recipes presently in the Armed Forces Recipe Service. Food in this facility would be prepared or heated on site. The facility should have one serving line and seats for approximately 150 customers. In addition, this outlet would ideally be located within 500 feet of the pier area. As a result of an analysis done under an IPA agreement between San Diego State University and NLABS (series volume 2, A Cost Benefit Analysis of the Use of Convenience Foods in a Military Foodservice Operation, by Mary Q. Hawkins, NATICK/TR–83/036), a high preference, 21-day A-ration menu was developed, which permits maximum flexibility in substituting commercially available prepared convenience foods for conventionally cooked recipes that are in the Armed Forces Recipe Service. This menu was used in the comparison of direct food and labor costs for the projected convenience systems versus the existing conventional system.

2. **Short-order outlet.** The short-order facility would operate in a prefabricated modular building located near the pier. This outlet should offer a limited and constant menu, consisting of hamburgers, hotdogs, french fries, etc., that would be served in disposables. This outlet would be open for lunch, dinner, and late-evening meals. Adjacent to the building would

be a patio area with an overhead covering to provide an eating area for patrons. The majority of the food at this location would also be cooked on site. A modular fast-foodservice facility purchase description containing facility and equipment specifications is contained in Appendix B.

3. **Vending machine service.** An outlet providing vending machine service would be located on the hangar deck of the carrier. This outlet should offer a menu consisting of prepackaged items that one would normally find in vending-type operations (e.g., canned soups, canned entrees, prepackaged salads, sandwiches, and desserts). It is planned that this outlet be operated under a contract arrangement with a commercial foodservice company. No cooking is to be done at this facility. Equipment will consist primarily of hot and cold coin-operated vending machines supplemented with microwave ovens for reheating.

B. Headcount Forecast

A forecast of the number of customers expected to attend each meal in each of the different outlets is presented below. Access to these facilities would be controlled by the requirement for presentation of the ship's ID card to gain entrance. It is important to note that these forecasts are for shipboard personnel only and are based on the following: (1) historical attendance rates onboard a carrier during an SRA period; (2) actual carrier personnel attendance data at the station EDF at NAS North Island; (3) the results of customer foodservice preference surveys conducted onboard the USS Kitty Hawk in October 1980; (4) the relative location of each outlet to the ship (i.e., the farther from the ship, the lower the attendance); (5) the continuance of COMNAVAIRPAC's policy of placing shipboard personnel on COMRATS during SRA periods.

Table 10

Forecast of meal attendance

Outlet	Breakfast	Lunch	Dinner	Late Evening
A. Weekdays				
A-ration	350	450	350	--
Short order	--	375	200	200
Vending	75	175	100	--
Total	475	1000	650	200
B. Weekends				
A-ration	100	250	200	--
Short order	--	200	100	100
Vending	50	75	75	--
Total	150	525	375	100

C. Meal Hours

The proposed meal hours associated with the headcount forecasts above for each of the facilities when a carrier is in an extended in-port period are as follows:

Table 11

Meal hours

Outlet	Breakfast	Lunch	Dinner	Late Evening
A. Weekdays				
A-ration	0600–0800	1100–1300	1600–1800	—
Short order	—	1100–1330	1530–1800	1900–2200
Vending	0600–0900	1030–1330	1530–1830	—
B. Weekends				
A-ration	0730–0900	1130–1300	1630–1800	—
Short order	—	1100–1300	1530–1800	1900–2200
Vending	0730–0900	1130–1330	1600–1800	—

D. Feeding the Duty Section

One of the issues that must be addressed by any proposed in-port foodservice system is the feeding of the ship's duty section, which is usually required to remain onboard the ship. There are several alternatives for providing meals to the duty section. The selection of which one to apply will depend on the policy set forth by the ship's captain. There are three alternatives.

1. **Vending operations.** With everyone receiving COMRATS, the duty section can obtain its meals at the vending machine operation which is planned to be located on the ship's hangar deck. This alternative appears less than ideal in that the duty section receives a meal that is lesser in quality than that served ashore.

2. **Nearby outlets.** Permit the duty section to rotate off the ship to eat at the nearby outlets. The convenience of the locations would minimize the time absent from the ship. In addition, the duty section could have head-of-the-line privileges or eat at early/late chow to minimize their time off the ship. This alternative could be further expanded to include box lunches prepared at the nearby outlets for MIDRATS for the duty section so that no one is required to leave the ship at this time. (This alternative has been used by carriers in SRA at NAS North Island).

3. **Transport food.** Transport hot/cold prepared food in bulk quantities in mermite cans onboard the ship. This option would require an additional serving line to be set up. While this alternative provides hot, nutritious meals to the duty section it requires a substantial increase in manpower to transport the food, serve it, and maintain a messdeck.

E. Foodservice Personnel Requirements

Based upon the forecasted headcounts presented in Table 10 and 11, the estimated foodservice personnel requirements are presented below. These figures are based on two watches and the standard "5 and 2" schedule that most MSs prefer when in port. These facilities will be manned by carrier foodservice personnel during in-port periods.

Table 12

Foodservice workers required by facilities

	A-Ration		Short Order		Vending[a]		System
	Per Watch	Total	Per Watch	Total	Per Watch	Total	Total
Watch Captain	1	2	--	--	--	--	2
Jack of the Dust	1	2	--	--	--	--	2
Cooks	6	12	4	8	--	--	20
Food Service Attendants	15	30	2	4	--	--	34

[a](As the vending machine operation on the carrier deck would be a contract operation, no foodservice personnel would be required.)

In addition, the following personnel would be required to manage the overall operation, prepare, and maintain financial records, and provide logistics support.

1 – Food Service Officer

1 – Leading Chief Petty Officer

2 – Records keepers

4 – Logistics support

8 Total

The forecasted total manpower requirement for the new system is therefore 28 MSs, compared to the 59 MSs that are assigned to a carrier (see volume 2 in this series, a Cost

Benefit Analysis of the Use of Convenience Foods in a Military Foodservice Operation, by Mary Q. Hawkins). (Neither figure includes personnel Temporary Duty (TDY), Temporary Additional Duty (TAD), or assigned to damage control, etc.)

The staffing levels in the A-ration facility are predicated on (1) the use of convenience foods to as great an extent possible, (2) the use of low-labor recipes from the Armed Forces Recipe Service, and (3) the predicted headcounts in Table 10. These estimates may have to be revised up or down, depending on attendance and the percentage of the menu that can be provided by the convenience foods.

The short-order staffing levels are based on worker requirements experienced at similar foodservice operations at other military installations (e.g., the mobile unit at the Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Plams,[4] the fast-food modular units at Ft. Ord[2,3] and Travis AFB.[5]

F. Organization and Financial Accountability

It is recommended that all three foodservice facilities that make up the in-port system described above operate under the control of the ship's Food Service Officer in a manner similar to an onboard foodservice operator. The Food Service Officer at the ashore installation will have maintenance and repair responsibility for the two ashore outlets as facilities but the operational responsibility will reside with the ship's Food Service Officer.

Financial reports and analyses, specifically, 338s showing weighted ration credits vs. the cost of food issued, for both government-operated outlets the proposed in-port system, will be consolidated prior to being sent to NAVFSSO. It is recommended, however, that each outlet in the system maintain its own financial records (i.e., issues vs. ration credits) prior to consolidation in order to maintain proper control and responsibility and to identify potential food cost problem areas.

G. Menus

Examples of the different types of menus that will be offered in the new system are presented in figures 1 and 2. The primary objective in designing the A-ration menu was to incorporate as many high-preference items as possible which are available in prepared form

[4]M. Davis, P. Brandler, W. Wilkinson, H. Meiselman, L. Birnbaum, L. Symington and D. Bissonnett. An evaluation of the New "Multi-Restaurant" Food Service System for the Marine Corps. NATICK/TR–81/023, Natick, MA; US Army Natick Research and Development Laboratories, 1980 (AD A108 375).

[5]G. Hertweck and R.L. Bustead. Experimental Evaluations of the Modular Fast Foodservice Facility at Travis AFB, NATICK/TR–75–34 OR/SA, US Army Natick Research and Development Laboratories, 1974 (AD A007124).

(from both DPSC and commercial sources) or easily prepared from recipes in the Armed Forces Recipe Service. The lower cost of the menu items prepared from the Armed Forces Recipes Service should balance the anticipated higher cost of the convenience food items. This strategy will permit the greatest flexibility in determining how large a percentage of the menu can be convenience foods without exceeding the Basic Daily Food Allowance (BDFA).

The menus in both the short-order outlet and the vending service are limited and do not change in large measure from day to day to simplify each operation and thus reduce labor requirements.

H. Food Cost Analysis

In any military foodservice operation, it is mandatory that food costs remain within established guidelines. To accomplish this with the proposed in-port system, it is recommended that the two ashore outlets be viewed as a consolidated foodservice operation or system, with the goal of balancing the combined food issues against combined weighted ration credits. This approach was used very successfully in the "multi-restaurant" concept for the Marine Corps at MCAGCC, Twentynine Palms, where the high costs of certain speciality menus were balanced by less expensive, short-order menus.[4]

Because of limited headcounts, ease of preparation of breakfast items and spaced arrivals at the morning meal, the need to incorporate convenience food items for breakfast was not warranted. Table 13 presents typical breakfast menus which may be offered. An average breakfast cost of $0.70 was used in determining daily food costs.

Each of the menus presented in the previous section has been priced by computer using standard portions in the Armed Force Recipe Service and DPSC food costs (FY 81 Costs). Sample meals and their respective costs as well as total menu costs are presented in the following tables (14–17). Where choices exist, the more expensive item is always used. The prices shown reflect food costs yielding a BDFA of $3.54.

Referring to Table 15, it will be noted that we have assumed that the cost of the A-ration breakfast remains constant at 20% of the BDFA or $0.70 per meal. As indicated, the average cost of the lunch and dinner meals prepared from scratch in the A-ration menu are $1.54 and $1.56, respectively. If approximately 50% of the entrees are replaced with convenience food products, the average costs assuming this 50/50 mixture of scratch and convenience items would increase to $1.61 for dinner and $1.67 for supper. One reason why these costs are not higher is that a lower cost reformed steak is used in lieu of grilled steak in the convenience menus.

Based on frequencies of choice projected headcounts and portion costs relative to the Fast-Foodservice Outlet, an average cost per meal as presented in Table 17, is $1.07.

	Day 1	Day 2	Day 3	Day 4
	Chicken Noodle Soup	Split Pea Soup	French Onion Soup	Cream of Mushroom Soup
	Grilled Reuben Sandwich	BBQ Ham Steak	Swiss Steak	Macaroni Beef w/Tomato
L	Baked Lasagna	Pizza	Pork Chop Suey	Hot Roast Beef Sandwich
U	French Fried Potatoes	Sweet Potatoes	Steamed Rice	French Fried Potatoes
N	Broccoli	Buttered Spinach	Beets	Buttered Lima Beans
C	Whole Kernel Corn	Carrots	Green Beans	Glazed Carrots
H	Tossed Salad	Tossed Salad	Tossed Salad	Tossed Salad
	Cottage Cheese w/Peach	Bing Cherry Gelatin	Orange Gelatin	Cottage Cheese w/Peach
	Cherry Pie	Chocolate Chip Cookies	Lemon Meringue Pie	Apple Pie
	Tapioca Pudding	Butterscotch Pudding	Brownies, Chocolate	Fruit Bar
	Cream of Tomato Soup	Chicken w/Rice Soup	Beef Vegetable Soup	Chicken Noodle Soup
	Sliced Roast Beef	Salisbury Steak	Veal Parmesan	Grilled Steak
D	Fried Chicken	Polish Sausage	Chicken A La King	BBQ Chicken
I	Mashed Potatoes	German Potato Salad	Mashed Potatoes	Baked Potato
N	Green Peas	Brussel Sprouts	Broccoli	Cauliflower
N	Stewed Tomatoes	Succotash	Wax Beans	Peas
E	Tossed Salad	Tossed Salad	Tossed Salad	Tossed Salad
R	Mixed Fruit Gelatin	Three Bean Salad	Cole Slaw	Potato Salad
	Angel Food Cake	Blackberry Pie	Yellow Cake w/Frost	Pumpkin Pie
	Chocolate Pudding	Spice Cake w/Btr. Cr. Frosting	Blueberry Crisp	Chocolate Cake w/Frosting

	Day 5	Day 6	Day 7
	Manhattan Clam Chowder	Chicken Vegetable	Minestrone Soup
	Fried Fish Portion	Baked Meat Loaf	Hot Turkey Sandwich
L	Sloppy Joe on Bun	Knockwurst	Tuna & Noodle Casserole
U	French Fried Potatoes	Baked Beans	Mashed Potatoes
N	Spinach	Sauerkraut	Zucchini
C	Squash	Green Beans	Beets
H	Tossed Salad	Tossed Salad	Tossed Salad
	Cottage Cheese w/Pineapple	Macaroni Salad	Cottage Cheese w/Peach
	Butterscotch Brownies	Hermits	Strawberry Rhubard Pie
	Cherry Pie	Boston Cream Pie	Apple Crisp
	Navy Bean Soup	Corn Chowder	Beef and Noodle Soup
	Baked Ham	Corned Beef	Grilled Ham
D	Spaghetti w/Meat	Baked Chicken	BBQ Beef Slices
I	Escalloped Potatoes	Boiled Potatoes	O'Brien Potatoes
N	Green Beans	Carrots	Green Beans
N	Havard Beets	Broccoli	Corn
E	Tossed Salad	Tossed Salad	Tossed Salad
R	Mixed Fruit Gelatin	Three Bean Salad	Fruit Gelatin
	Carrot Cake w/Frost	Peach Pie	Banana Cake w/Frosting
	Vanilla Pudding	Chocolate Pudding	Coconut Cream Pie

Figure 1. Proposed cyclic menu for A-ration outlet

Week 1

	Day 1	Day 2	Day 3	Day 4
	Cream of Tomato Soup	Beef Vegetable Soup	Split Pea Soup	Cream of Mushroom Soup
	Baked Chicken w/Cream	Newport Fried Chicken	Hot Roast Pork Sandwich	Hot BBQ Beef Sandwich
L	of Mushroom Soup	Braised Beef Tips	Stuffed Cabbage	Pork Chow Mein
U	Pepper Steak	w/Gravy	Escallop Potatoes	Steamed Rice
N	Buttered Noodles	French Fried Potatoes	Whole Kernel Corn	Carrots
C	Green Beans	Peas	Beets	Green Beans
H	Stewed Tomatoes	Carrots	Tossed Salad	Tossed Salad
	Tossed Salad	Tossed Salad	Three Bean Salad	Cottage Cheese w/Pineapple
	Fruit Cocktail Gelatin	Cottage Cheese w/Peach	Yellow Cake w/Orange	Marble Cake w/Frosting
	Devil's Food Cake	Cherry Pie	Frosting	Butterscotch Pudding
	w/Frosting	Sugar Cookies	Chocolate Chip Cookies	
	Vanilla Cream Pudding			
	Navy Bean Soup	Cream of Chicken Soup	Beef & Noodle Soup	Tomato Rice Soup
	Veal Cutlet	Stuffed Cheese Shells	Roast Turkey	Fried Fish Fillet
D	Baked Fish	Roast Pork Loin	Swedish Meatballs	Stuffed Pepper
I	Baked Potato	Mashed Potatoes	Buttered Noodles	French Fried Potatoes
N	Broccoli	Spinach	Succotash	Lima Beans
N	Beets	Squash	Fried Cauliflower	Stewed Tomatoes
E	Tossed Salad	Tossed Salad	Tossed Salad	Tossed Salad
R	Three Beans Salad	Bing Cherries	Lime Gelatin	Gelatin Salad
	Cheesecake	Pecan Pie	German Chocolate Cake	Lemon Meringue Pie
	Dutch Apple Pie	Tapioca Pudding	Blueberry Pie	Banana Cake w/Frosting

	Day 5	Day 6	Day 7
	French Onion Soup	Cream of Potato Soup	Clam Chowder
	Hot Roast Beef Sandwich	Grilled Liver w/Onions	Grilled Steak
L	Chicken Fried Beef Patties	Pizza	Fried Chicken
U	Oven Browned Potatoes	Au Gratin Potatoes	Mashed Potatoes
N	Mixed Greens	Buttered Cauliflower	Zucchini
C	Whole Kernel Corn	Green Beans	Beets
H	Tossed Salad	Tossed Salad	Tossed Salad
	Macaroni Salad	Cottage Cheese w/Peach	Gelatin w/Peach
	Peach Pie	Apple Crisp	Banana Cream Pie
	Strawberry Shortcake	Chocolate Pudding	Oatmeal Cookies
	Corn Chowder	Chicken Rice Soup	Beef w/Barley Soup
	Beef Stew	Chicken Pot Pie	Grilled Pork Steaks
D	Baked Lasagna	BBQ Spare Ribs	Cheese Ravioli
I	Mashed Potatoes	French Fried Potatoes	Escallop Potatoes
N	Peas	Brussel Sprouts	Green Beans
N	Beets	Peas	Corn
E	Tossed Salad	Tossed Salad	Tossed Salad
R	Cottage Cheese	Potato Salad	Cole Slaw
	Yellow Cake w/Frosting	Carrot Cake	Cherry Pie
	Chocolate Brownies	Fruit Bars	Coconut Cake w/Frosting

Figure 1. Proposed cyclic menu for A-ration outlet (cont'd)

Week 2

	Day 1	Day 2	Day 3	Day 4
	Cream of Mushroom Soup	Split Pea Soup	French Onion Soup	Manhattan Clam Chowder
	Grilled Ham & Cheese	Franks w/Cheese &	Breaded Chipper Perch	Hot Roast Turkey Sandwich
L	Sandwich	Bacon	Turkey Pot Pie	Veal Cutlet
U	Salisbury Steak	Sloppy Joe's on Bun	Mashed Potatoes	Mashed Potatoes
N	Oven Brown Potato	French Fried Potatoes	Whole Kernel Corn	Green Peas
C	Whole Kernel Corn	Broccoli	Spinach	Cabbage
H	Green Beans	Beets	Tossed Salad	Tossed Salad
	Tossed Salad	Tossed Salad	Cottage Cheese w/Peach	Cottage Cheese w/Pineapple
	Red Gelatin w/Banana	Potato Salad	Angel Food Cake	Lemon Meringue Pie
	Apple Crisp	Boston Cream Pie	Butterscotch Pudding	Oatmeal Cookies
	Pumpkin Pie	Chocolate Chip Cookies		
	Cream of Potato Soup	Beef Vegetable Soup	Chicken Noodle Soup	Navy Bean Soup
	Swiss Steak	Chicken Chow Mein	Baked Ham	Beef Tips w/Gravy
D	Chicken Cacciatore	Breaded Pork Chops	Meat Loaf	Baked Chicken & Noodles
I	Mashed Potatoes	Steamed Rice	Candied Sweet Potatoes	Steamed Rice
N	Peas	Green Beans	Cauliflower w/Cheese	Zucchini
N	Carrots	Succotash	Sauce	Broccoli
E	Tossed Salad	Tossed Salad	Stewed Tomatoes	Tossed Salad
R	Three Bean Salad	Macaroni Salad	Tossed Salad	Cottage Cheese
	Cheesecake	Apple Sauce	Cole Slaw	Chocolate Pudding
	Brownies, Chocolate	Chocolate Cake/Frosting	Yellow Cake w/Orange	Butterscotch Brownies
		Blueberry Pie	Frosting	
			Dutch Apple Pie	

	Day 5	Day 6	Day 7
	Chicken Vegetable Soup	Beef w/Barley Soup	Cream of Mushroom Soup
	Macaroni & Beef w/Tomato	Chicken Fried Beef Patties	Steak Sandwich
L	Grilled Ham Steaks	Hot Roast Pork Sandwich	Roast Turkey
U	French Fried Potatoes	Mashed Potatoes	Candied Sweet Potatoes
N	Glazed Carrots	Broccoli	Green Beans
C	Green Beans	Squash	Whole Kernel Corn
H	Tossed Salad	Tossed Salad	Tossed Salad
	Three Bean Salad	Macaroni Salad	Cottage Cheese w/Peach
	Strawberry Shortcake	Carrot Cake	Strawberry Rhubarb Pie
	Banana Cream Pie	Chocolate Cream Pie	Boston Cream Pie
	Cream of Tomato Soup	Clam Chowder	Vegetable Beef Soup
	Spaghetti w/Meat Sauce	Chili	Fried Fish Filet
D	Pepper Steak	Fried Shrimp	Beef Stew
I	Baked Potato	French Fried Potatoes	Mashed Potatoes
N	Peas	Spinach	Brussel Sprouts
N	Corn	Lima Beans	Succotash
E	Tossed Salad	Tossed Salad	Tossed Salad
R	Red Gelatin	Cole Slaw	Gelatin w/Fruit
	Peach Cobbler	German Chocolate Cake	Banana Cake
	Yellow Cake w/Frost	Tapioca Pudding	Apple Crisp

Figure 1. Proposed cyclic menu for A-ration outlet (cont'd)

Week 3

Choice of One (All Include Cole Slaw)

1/4 Pounder Hamburger	(2) Hot Dogs
1/4 Pounder Hamburger w/Cheese	Chicken Filet Sandwich
Submarine Sandwich	Fish Filet Sandwich

Chili

Choice of One

French Fried Potatoes	Potato Chips

Choice of One

Fruit Pie	Ice Cream Sundae

Assorted Cakes

Choice of One

Milk	Assorted Soft Drinks

Thick Shake

Hours of Operation

Lunch	Dinner	Extended
1100–1330	1530–1800	1900–2200

Figure 2. Proposed menu and hours for fast-foodservice facility

Table 13

Sample A-Ration breakfasts and costs

	Food Costs
Fresh Fruit	$0.11
Fried Eggs	.11
Crisp Bacon	.19
Hash Brown Potatoes	.06
Toast w/Jelly	.08
Coffee	.04
Total Raw Food Costs	$0.59
Fresh Fruit	$0.11
Dry Cereal, Ready-to-Eat (2)	.12
Milk	.14
Toast w/Jelly	.08
Coffee	.04
Total Raw Food Costs	$0.49
Fruit Juice	$0.18
Hotcakes	.13
Syrup & Butter	.04
Bacon Slices	.19
Coffee	.04
Total Raw Food Costs	$0.58
Fruit Juice	$0.18
Scrambled Eggs	.11
Crisp Bacon	.19
Pancakes w/Syrup & Butter	.17
Toast w/Jelly	.08
Milk	.14
Coffee	.04
Total Raw Food Costs	$ .91

Table 14

Sample convenience A-ration menu selections and costs

	Food Costs
A. Lunch (Day 1)	
* Chicken Noodle Soup	$0.07
* Baked Lasagna	.70
Broccoli	.11
Tossed Salad	.13
* Cherry Pie	.33
Fruit Juice	.08
Milk	.14
Total Raw Food Cost	$1.56
B. Dinner (Day 12)	
* Navy Bean Soup	$0.07
* Baked Fish	.70
Baked Potato	.03
Beets	.07
* Cheesecake	.43
Coffee	.04
Milk	.14
Total Raw Food Cost	$1.48

* Convenience foods

Table 15

21 Day A-ration cost analysis

Day	Breakfast	Lunch		Dinner		Daily Total	
		100% Scratch	50% Scratch/50% Convenience	100% Scratch	50% Scratch/50% Convenience	100% Scratch	50% Scratch/50% Convenience
1	0.70	1.34	1.52	1.44	1.06	3.48	2.28
2	.70	1.68	—	1.44	1.46	3.82	2.16
3	.70	1.68	2.40	1.42	1.57	3.80	4.67
4	.70	1.35	1.52	2.65	1.99	4.70	4.21
5	.70	1.72	1.80	1.34	1.59	3.76	4.09
6	.70	1.18	1.40	1.33	1.51	3.21	3.61
7	.70	1.09	1.39	1.32	1.52	3.11	3.61
8	.70	1.78	1.89	1.38	1.50	3.86	4.09
9	.70	1.49	1.52	1.13	1.66	3.32	3.88
10	.70	1.16	1.27	1.17	1.37	3.03	3.34
11	.70	1.32	1.65	1.30	1.46	3.32	3.81
12	.70	1.38	1.56	1.36	1.52	3.44	3.78
13	.70	1.07	—	1.99	2.17	3.76	2.87
14	.70	2.94	2.12	1.50	—	5.14	2.82
15	.70	1.25	1.54	1.81	2.47	3.76	4.71
16	.70	1.35	1.62	1.49	1.57	3.54	3.89
17	.70	1.07	—	1.61	1.76	3.38	2.46
18	.70	1.72	1.87	1.31	1.32	3.73	3.89
19	.70	1.53	—	1.78	1.82	4.01	2.52
20	.70	1.25	1.46	2.46	2.59	4.41	4.75
21	.70	2.88	1.91	1.38	1.57	4.96	4.18
Daily Avg	0.70	1.54	1.61	1.56	1.67	3.80	3.98

Table 16

Fast-foodservice typical menu selections and costs

	Food Costs
Cheeseburger (3/4 lb)	$0.50
French Fries	.07
Cup Cakes	.20
Soft Drink	.09
Cole Slaw	.17
Total Raw Food Costs	$ .03
(2) Hot Dogs	$0.38
French Fries	.07
Fruit Turnover (Fried)	.13
Milk	.14
Cole Slaw	.17
Total Raw Food Costs	$ .89
Submarine Sandwich	$0.52
French Fries	.07
Ice Cream Sundae	.20
Thick Shake	.22
Cole Slaw	.17
Total Raw Food Costs	$ .18

Table 17

Weighted average costs for fast-foodservice

		Lunch		Dinner		Late				
	Frequency	Headcounts	Weighted Average	Headcounts	Weighted Average	Headcount	Weighted Average	Daily Total	$/Por	Daily Costs
1/4 lb Hamburger	.20	375	75	200	40	200	40	155	0.46	71.30
1/4 lb Cheeseburger	.40	375	150	200	80	200	80	310	.50	155.00
Submarine sandwich	.15	375	56	200	30	200	30	116	.52	60.32
(2) Hotdogs	.10	375	37	200	20	200	20	77	.38	29.26
Chicken filet sandwich	.05	375	19	200	10	200	10	39	.65	25.35
Fish filet sandwich	.05	375	19	200	10	200	10	39	.52	20.28
Chili	.05	375	19	200	10	200	10	39	.30	11.70
			375		200		200	775		$373.21
French fries	.80	375	300	200	160	200	160	620	.07	43.40
Bagged chips	.20	375	75	200	40	200	40	155	.12	18.60
			375		200		200	755		$62.00
Fruit pie (fried)	.30	375	113	200	60	200	60	233	.13	30.29
Ice cream sundae	.40	375	150	200	80	200	80	310	.20	62.00
Assorted cakes	.30	375	113	200	60	200	60	232	.20	46.40
			375		200		200	775		$138.69
Milk	.10	375	37	200	20	200	20	77	.14	10.78
Thick shake	.50	375	188	200	100	200	100	388	.22	85.36
Assorted soft drinks	.40	375	150	200	80	200	80	310	.09	27.90
			375		200		200	775		$124.00
Cole slaw	1.00	375	375	200	200	200	200	775	.17	$131.75

Total Raw Food Cost Total = $829.69
Avg Meal Cost = 1.07

Utilizing the headcount forecasts presented in Table 10 and assuming a BDFA of $3.54, the projected daily weighted ration credits for the proposed system are calculated as follows:

	A-Ration	Short Order	Headcount		Weighted Ration Factor	Weighted Ration
Breakfast	350	—	350	X	.2	70
Dinner	450	375	825	X	.4	330
Supper	350	200	550	X	.4	220
Late evening	—	200	200	X	.4	80
			Total Daily Weighted Ration			700

A total of 700 weighted rations x $3.54 = $2,478.00 weighted ration credits.

Projected daily food costs for the new system can be calculated based on the average estimated meal costs at each outlet, as provided in tables 14 and 16, multiplied by the forecasts of their respective headcounts. The calculations are as follows.

Table 18

Estimated daily food costs

	Breakfast	Lunch	Dinner	MIDRATS	Total
A-ration: (with convenience foods)					
Projected headcount	350	450	350		1150
Cost/meal	$.70	$1.61	$1.67	—	
Total food cost	245.00	724.50	584.50		1554.00
Short order:					
Projected headcount		375	200	200	775
Cost/meal		$1.07	$1.07	$1.07	
Total food cost		401.25	214.00	214.00	829.25
				Total Daily Food Cost	$2,383.25

The daily food cost is therefore $94.75 or 4% below the weighted ration credit allowance and within the limits of our projections, thus, the consolidated system will be in balance. It should be noted that these figures are only estimates and that significant changes in either the relative attendance rates at each of the outlets or the actual food costs incurred can have an impact on the results. However, while no allowance has been made for seconds, costs assume each food group is selected by 100% of the customers, which is never the case. Further, there is sufficient flexibility in the menu design to insure that the BDFA food cost requirement can be met. As with any system, management control will need to be exercised and adjustments made to the menu if required.

I. Interaction With the Base Foodservice Operation

The in-port feeding system will depend upon the base foodservice operation in the following two areas.

1. Subsistence Support. The base foodservice operation should have the responsibility for ordering and stocking subsistence for the in-port feeding system. This would include standard and special test items. Frequency of delivery to the in-port feeding locations would be dependent on customer attendance rates and available on-site storage capacities. The ship's Food Service Officer should assign two MSs to the ashore EDF to assist in providing this subsistence support. Vendor delivered items, such as fresh milk and bread, should be delivered directly to the in-port feeding facilities.

2. Maintenance and Repairs of Facilities. The base Food Service Officer should have custodial responsibility for both in-port feeding facilities and should insure that repairs are made when required. The ship's Food Service Officer will have operational responsibility for the facilities, as they will be manned with MSs from the ship.

J. Systems Startup Costs

The estimated startup (i.e., nonrecurring) costs to put the in-port foodservice system into operation at NAS, North Island, for example, are presented in Table 19. The A-ration outlet costs are based on similar types of work done at NAS Alameda and MCAGCC, Twentynine Palms (Davis, 1980).[4] The short order facility costs are extrapolated from the cost of an identical unit installed at Ft. Ord in March 1981 (Hill, 1982 and 1982a).[2]

Table 19

Estimated costs for in-port feeding system

Outlet	Structure/ Building	Construction Renovation & Repairs	Equipment	Installation	Furniture	Fixtures & Furnishings	Total
A-Ration	——	$300,000	$175,000	$50,000	$35,000	$15,000	$575,000
Short Order	85,000[a]	10,000[b]	——	35,000	5,000	2,000	137,000
Totals	$85,000	$310,000	$175,000	$85,000	$40,000	$17,000	$712,000

[a]This includes all equipment, furniture, etc.

[b]This is for the construction of a covered patio adjacent to the unit.

VI. CONCLUSIONS AND RECOMMENDATIONS

COMNAVAIRPAC perceives the problem of feeding shipboard personnel in-port as critical, particularly for periods that are longer than about 20 days. Secondly, the Navy Food Management Team concurs with the need to reduce MS workloads when ships are in-port for extended periods. Thus, there is a need for a standard, well-designed, in-port foodservice system. The merits of this proposed concept for in-port feeding of carrier shipboard personnel can, however, be ultimately determined only through a comprehensive test. That is, while many questions pertaining to an in-port foodservice concept have been addressed in this report, many can only be answered by testing the proposed system and analyzing the results. Fundamental questions to be answered by testing include the following.

1. What is the customer acceptance towards the new system in comparison with current practices?

2. Under actual operating conditions, can convenience foods available both from DPSC and also from commercial sources be incorporated into a menu and still have the total foodservice operation meet the BDFA cost requirements?

3. From the perspective of the ship's management, what effect does the new system have on issues such as (a) impact of the feeding concept on shipboard productivity hours during overhauls; (b) ability to respond to special feeding requirements (e.g., MIDRATS, box lunches for personnel going to schools); (c) ability to free foodservice personnel for training, upkeep and leave; (d) control requirements for handling and storing food ashore versus in ship's storerooms; and (3) general effect on crew morale?

4. What is the adaptability of elements of the new system (e.g., facilities, equipment, menus, food products) to other in-port situations and installations?

5. Finally, this type of system would also be an ideal application for the item-pricing concept, which would introduce tighter management and financial control and which would provide greater confidence in the system's capabilities to accommodate the increased cost of convenience foods. It is therefore recommended that the incorporation of the item-pricing concept also be considered as part of any in-port system test and an evaluation.

The potential this concept has for widespread improvement over current alternatives through the reduction in foodservice labor requirements while in-port as well as the improvement in shipboard overhaul productivity warrants such an evaluation. Costs of testing can be significantly reduce if an existing physical structure in close proximity to the pier area is utilized for the A-ration facility.

VII. REFERENCES

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APPENDIX A

14-Day Menus Developed to Test Customer Acceptability and Mess Management Specialists' Opinions Toward Convenience Foods

APPENDIX A

TABLE OF CONTENTS

I. 14-Day Menu:

USS Kitty Hawk at NAS North Island

(estimated on 900 per meal)

Day 1

Recipe	Name	No. Portions	Comments
A. Lunch			
P–25–1	Onion Soup	450	
L–132–I	Chicken Pot Pie	450	
Special	Steak Sandwich	450	Reformed steak
Q–45–1	French Fries	900	
Q–G–3	Buttered Green Beans	450	
Q–17–1	Glazed Carrots	450	
Special	Cherry Crunch	450	Tray Pack plus topping
I–45	Pumpkin Pie	450	
K–16	Whipped Topping	900	
	Assorted Breads	900	
	Salad Bar	900	
	Assorted Beverages	900	
B. Dinner			
	Minestrone Soup	450	Canned, condensed
Special	Baked Stuffed Shells w/Sauce	450	Frozen; sauce is canned
L–84	Baked Stuffed Pork Chop	450	
O–16–1	w/Brown Gravy	450	
Special	German Potato Salad	900	Tray Pack
Q–6–3	Buttered Peas	450	
Q–20	Fried Cauliflower	450	
Special	Peach Pie	450	Frozen
I–50–2	Coconut Cream Pie	450	
	Assorted Breads	900	
	Salad Bar	900	
	Assorted Beverages	900	

USS Kitty Hawk

Day 2

Recipe	Name	No. Portions	Comments
A. Lunch			
P–23	Split Pea Soup	450	
Special	Baked Lasagna	450	Frozen
L–18	Beef in BBQ Sauce	450	
Special	Au Gratin Potatoes	900	Dehydrated Mix
Q–G–3	Buttered Corn	450	
Q–G–3	Buttered Broccoli	450	
Special	Devil's Food Cake w/Choc Frost	450	Frozen
J–27–1	Apple Crunch	450	
K–16	Whipped Topping	450	
	Assorted Breads	900	
	Salad Bar	900	
	Assorted Beverages	900	
B. Dinner			
	Chicken w/Rice Soup	450	Canned, condensed
Special	Beef Stew	450	Tray Pack
	Cheese Ravioli	450	Frozen
	w/Spaghetti Sauce	450	Canned
Q–57	Mashed Potatoes	450	
Q–8	Harvard Beets	450	
Q–G–3	Buttered Lima Beans	450	
I–16–I	Blackberry Pie	450	
Special	Banana Cake w/Frosting	450	Frozen
	Assorted Breads	900	
	Salad Bar	900	
	Assorted Beverages	900	

USS Kitty Hawk

Day 3

Recipe	Name	No. Portions	Comments
A. Lunch			
P–24	Chicken Noodle Soup	450	
L–59	Chili	450	
Special	Sliced Pork w/Gravy	450	Tray Pack
Q–50	Oven Browned Potatoes	900	
	Apple Sauce	450	
Q–G–3	Buttered Mixed Vegetables	450	
Q–73	Stewed Tomatoes	450	
I–33	Lemon Meringue Pie	450	
Special	Coconut Cake w/Frosting	450	Frozen
	Assorted Breads	900	
	Salad Bar	900	
	Assorted Beverages	900	
B. Dinner			
	Beef w/Barley Soup	450	Canned, condensed
L–143	Sliced Turkey	450	
O–16–4	Giblet Gravy	450	
E–4	Spaghetti	450	
Special	Meatballs w/Sauce	450	Frozen
O–21	Savory Bread Dressing	450	
Q–54–2	O'Brien Potatoes	450	
Q–G–3	Buttered Green Beans	900	
Q–67	Candied Sweet Potatoes	450	
H–2–3	Chocolate Brownies	450	
	Assorted Ice Cream	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 4

Recipe	Name	No. Portions	Comments
A. Lunch			
	Cream of Mushroom Soup	450	Canned, condensed
Special	Stuffed Peppers	450	Tray-Pack
L–62	Franks and Cheese	450	
Q–2	Home Baked Beans	900	
Q–27	Sauteed Corn	450	
Q–G–3	Buttered Brussel Sprouts	450	
I–8	Apple Pie	450	
Special	Cheese Cake	450	Frozen
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
	New England Clam Chowder	450	Canned, condensed
Special	Grilled Steak (Ref)	450	Use Armour (7 oz)
L–144	Newport Fried Chicken	450	
Special	Scalloped Potatoes w/Ham	900	Tray Pack
Q–G–3	Buttered Spinach	450	
Q–65	Sauteed Succotash	450	
Special	Coconut Cream Pie	450	Frozen
J–8–1	Apricot Crisp	450	
K–16	Whipped Topping	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 5

Recipe	Name	No. Portions	Comments
A. Lunch			
L–129–2	Beef w/Noodle Soup	450	Dehydrated
L–129–2	Chicken A La King	450	
Special	Swedish Meatballs	450	Frozen
E–5	Steamed Rice	900	
Q–G–1	Buttered Peas	450	
Q–G–3	Buttered Lima Beans	450	
Special	Carrot Cake	450	Mix
Special	Cream Cheese Frosting	450	Mix
Special	Strawberry Shortcake	450	Frozen sponge cake
K–16	Whipped Topping	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
P–26	Tomato Vegetable Soup	450	
Special	Sliced Roast Beef w/Gravy	450	Frozen
L–121	Fried Shrimp	450	
Special	Macaroni and Cheese	900	Frozen
Q–G–3	Buttered Carrots	450	
Q–G–3	Buttered Broccoli	450	
G–32–2	Boston Cream Pie	450	
Special	Lemon Crunch	450	Frozen
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 6

Recipe	Name	No. Portions	Comments
A. Lunch			
	Chicken Noodle Soup	450	
Special	Sloppy Joe	450	Canned, condensed
L–124	Tuna and Noodle Casserole	450	Frozen
Q–57	Mashed Potatoes	900	
Q–G–1	Black Eyed Peas	450	
Q–7	Lyonnaise Green Beans	450	
Special	Strawberry Cream Pie	450	Frozen
H–3–1	Butterscotch Brownies	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
	Tomato Soup	450	Canned, condensed
Special	Stuffed Cabbage	450	Tray Pack
L–103	Veal Parmesan	450	
Q–52	Rissole Potatoes	900	
Q–G–1	Buttered Asparagus	450	
Q–G–3	Buttered Cauliflower	450	
H–20	Chocolate Chip Cookies	450	
	Assorted Ice Cream	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 7

Recipe	Name	No. Portions	Comments
A. Lunch			
	Beef w/Barley Soup	450	Canned, condensed
L–130	Chicken Cacciatore	450	
Special	Salisbury Steak	450	Frozen
Q–45–1	French Fries	900	
Q–G–3	Buttered Greens	450	
Q–G–1	Buttered Corn	450	
G–32	Yellow Cake	450	
G–39–5	Orange Icing	450	
Special	Blueberry Pie	450	Frozen
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
	Bean w/Bacon Soup	450	Canned, condensed
Special	Macaroni and Beef	450	Tray Pack
L–69	Baked Ham	450	
O–10	Raisin Sauce	450	
Q–51–1	Au Gratin Potatoes	450	
Q–17	Carrots Normandy	450	
Q–G–2	Buttered Cabbage	450	
Special	Apple Crunch	450	Tray Pack & Topping
K–16	Whipped Topping	450	
H–17	Hermits	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 8

Recipe	Name	No. Portions	Comments
A. Lunch			
P–25–1	Onion Soup	450	
Special	Chicken A La King	450	Frozen
	Cheese Ravioli	450	Canned
Q–77	Parsley Buttered Potato	900	
Q–G–1	Buttered Corn	450	
Q–10	Broccoli Polonaise	450	
G–53	Angel Food Cake	450	
Special	Dutch Apple Pie	450	Frozen
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
	Beef w/Noodle Soup	450	Dehydrated
Special	Beef in Barbeque Sauce	450	Frozen
L–80	Pork Chop Suey	450	
E–5	Steamed Rice	450	
Q–G–3	Buttered Wax Beans	450	
Q–G–3	Buttered Brussel Sprouts	450	
I–37	Peach Pie	450	
Special	German Chocolate Cake	450	Frozen
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 9

Recipe	Name	No. Portions	Comments
A. Lunch			
	Cream of Chicken Soup	450	Canned, condensed
N–27	Sloppy Joe	450	
L–65–3	Grilled Ham Steaks	450	
Special	Macaroni and Cheese	900	Tray Pack
Q–G–3	Buttered Lima Beans	450	
Q–17	Carrots Lyonnaise	450	
Special	Boston Cream Pie	450	Frozen
	Assorted Ice Cream	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
P–27	Green Pea Soup	450	
Special	Sliced Turkey w/Gravy	450	Tray Pack
L–37	Salisbury Steak	450	
O–21	Savory Bread Dressing	450	
Special	Scalloped Potatoes	900	Dehydrated mix
Q–G–3	Buttered Mixed Vegetables	450	
Q–8–1	Beets in Orange Sauce	450	
Special	Yellow Cake w/Chocolate Frost	450	Frozen cake, canned frosti
I–53–2	Cherry Pie	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 10

Recipe	Name	No. Portions	Comments
A. Lunch			
	Beef w/Barley Soup	450	Canned, condensed
L–7	Grilled Steak	450	
L–38	Spaghetti w/Meatballs	450	
E–4	Spaghetti	450	
Q–44	Baked Potato	450	
Q–G–1	Buttered Green Beans	450	
Q–20	Fried Cauliflower	450	
Special	Lemon Meringue Pie	450	Frozen
G–32–13	Marble Cake w/Chocolate Frost	450	Canned frosting
B. Dinner			
	Minestrone Soup	450	Canned, condensed
L–25	Baked Lasagna	450	
Special	Sliced Pork w/Gravy	450	Frozen
Special	Home Baked Beans	900	Tray Pack
Q–G–3	Buttered Broccoli	450	
Q–G–3	Buttered Corn	450	
Special	Pecan Pie	450	Frozen
Special	Chocolate Cake w/Icing	450	Frozen, uniced cake canned frosting
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 11

Recipe	Name	No. Portions	Comments
A. Lunch			
	Chicken w/Rice Soup	450	Canned, condensed
Special	Sliced Roast Beef	450	Tray Pack
L–24	Sutffed Cabbage	450	
Q–51–1	Au Gratin Potatoes	900	
Q–G–3	Buttered Mixed Vegetables	450	
Q–G–1	Buttered Spinach	450	
Special	Yellow Cake w/Icing	450	Frozen
	Blueberry Pie	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
	Manhattan Clam Chowder	450	Canned, condensed
L–120	Shrimp Creole	450	
Special	Beef Tips w/Gravy	450	Frozen
E–5	Steamed Rice	900	
Q–12	Fried Cabbage	450	
Q–G–3	Buttered Zucchini	450	
Special	Pumpkin Pie	450	Frozen
K–16	Whipped Topping	450	
G–5	Banana Cake	450	
G–39–1	Banana Cream Frosting	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 12

Recipe	Name	No. Portions	Comments
A. Lunch			
P–26	Tomato Vegetable Soup	450	
Special	Chili	450	Tray Pack
Special	Assorted Mexican Items	450	Frozen
Q–75–1	Refried Beans	900	Canned
Q–G–1	Buttered Green Beans	450	
Q–G–3	Buttered Brussel Sprouts	450	
G–35–1	Cheesecake	450	
Special	Carrot Cake	450	Frozen
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
	Beef Noodle Soup	450	Canned, condensed
Special	Chicken Cacciatore	450	Tray Pack
L–41	Swedish Meatballs	450	
E–4–3	Buttered Noodles	900	
Q–G–3	Buttered Peas	450	
Q–G–1	Buttered Corn	450	
J–17	Butterscotch Pudding	450	
G–12	Devil's Food Cake	450	
G–39	w/Chocolate Frost	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 13

Recipe	Name	No. Portions	Comments
A. Lunch			
P–25–1	Onion Soup	450	
Special	Beef Stew	450	Frozen
L–111–2	Fried Fish Portions	450	
Q–57	Mashed Potatoes	450	
Q–G–1	Buttered Peas	450	
Q–G–1	Buttered Carrots	450	
Special	Apple Pie	450	Frozen
I–50–5	Strawberry Cream Pie	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
P–23	Split Pea Soup	450	
L–44	Corned Beef	450	
Special	Veal Parmesan	450	Frozen
Q–45–1	French Fries	450	
Q–G–3	Buttered Greens	450	
Q–G–2	Buttered Cabbage	450	
Special	Chocolate Brownies	450	Frozen
J–27–5	Peach Crunch	450	
K–16	Whipped Topping	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

USS Kitty Hawk

Day 14

Recipe	Name	No. Portions	Comments
A. Lunch			
	Cream of Mushroom Soup	450	Canned, condensed
L–28–1	Chili Mac	450	
Special	Pork Chop Suey	450	Frozen
E–5	Steamed Rice	900	
Q–G–3	Buttered Succotash	450	
Q–8–1	Beets in Orange Sauce	450	
G–16	Strawberry Shortcake	450	
K–16	Whipped Topping	450	
	Assorted Ice Cream	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	
B. Dinner			
P–24	Chicken Noodle Soup	450	
L–16–1	Swiss Steak w/Gravy	450	
Special	Stuffed Pepper	450	Frozen
M–42	German Potato Salad	900	
Q–G–3	Buttered Cauliflower	450	
Q–G–3	Buttered Green Beans	450	
Special	Chocolate Cream Pie	450	Frozen
J–27–3	Cherry Crunch	450	
K–16	Whipped Topping	450	
	Assorted Breads	900	
	Assorted Beverages	900	
	Salad Bar	900	

II. 14-Day Menu:

USS ALAMO at NAVSTA San Diego

(estimated on 200 per meal)

Day 1

Recipe	Name	No. Portions	Comments
A. Lunch			
P–25–1	Onion Soup	100	
L–132–1	Chicken Pot Pie	100	
Special	Sliced Roast Beef w/Gravy	100	Tray Pack
Q–57	Mashed Potatoes	200	
Q–G–3	Buttered Green Beans	100	
Q–17–1	Glazed Carrots	100	
I–45	Pumpkin Pie	100	
Special	Cherry Crisp	100	Tray Pack
K–16	Whipped Topping	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Minestrone Soup	100	Canned, condensed
Special	Baked Stuffed Cheese Shells	100	Frozen
Special	Swiss Steak w/Brown Gravy	100	Frozen
Special	Scalloped Potatoes & Ham	200	Tray Pack
Q–G–3	Buttered Peas	100	
Q–20	Fried Cauliflower	100	
H–20	Chocolate Chip Cookies	100	
J–25–3	Coconut Cream Pudding	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 2

Recipe	Name	No. Portions	Comments
A. Lunch			
P–24	Chicken Noodle Soup	100	
Special	Baked Lasagna	100	Frozen
Special	Chicken Breasts in Sauce	100	Tray Pack
Special	Macaroni & Cheese	200	Tray Pack
Q–G–3	Buttered Mixed Vegetables	100	
Q–G–3	Buttered Broccoli	100	
Special	French Cream Cheesecake	100	Frozen
J–1	Apple Crisp	100	
K–16	Whipped Topping	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
P–27	Green Pea Soup	100	
L–22	Beef Stew	100	
Special	Tuna & Noodle Casserole	100	Frozen
Q–57	Mashed Potatoes	200	
Q–8	Harvard Beets	100	
Q–G–3	Buttered Lima Beans	100	
Special	Peach Pie	100	Frozen
H–27	Sugar Cookies	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 3

Recipe	Name	No. Portions	Comments
A. Lunch			
P–2–2	Turkey w/Rice Soup	100	
L–59	Chili	100	
Special	Sliced Pork w/Gravy	100	Frozen
Special	Au Gratin Potatoes	200	Dehydrated mix
Q–G–3	Buttered Corn	100	
Q–73	Stewed Tomatoes	100	
I–33	Lemon Meringue Pie	100	
Special	Coconut Cake	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
P–26	Tomato Vegetable Soup	100	
Special	Beef Tips w/Gravy	100	Tray Pack
L–80	Pork Chop Suey	100	
E–7–2	Fried Rice	200	
Q–G–3	Buttered Green Beans	100	
Q–67	Candied Sweet Potatoes	100	
H–23	Chocolate Brownies	100	
	Assorted Ice Cream	100	
	Assorted Bread	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 4

Recipe	Name	No. Portions	Comments
A. Lunch			
	Beef w/Barley Soup	100	Canned, condensed
Special	Stuffed Peppers	100	Tray Pack
L–62	Franks & Cheese	100	
Q–3	Home Baked Beans	200	
Q–G–3	Buttered Mixed Vegetables	100	
Q–G–3	Buttered Brussel Sprouts	100	
I–8	Apple Pie	100	
Special	Devil's Food Cake w/Chocolate Icing	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Manhattan Clam Chowder	100	Canned, condensed
L–9–2	Yankee Pot Roast	100	
L–121–1	Shrimp	100	
Special	Macaroni & Cheese	200	Frozen
Q–G–3	Buttered Carrots	100	
Q–G–3	Buttered Broccoli	100	
G–32–2	Boston Cream Pie	100	
J–17	Butterscotch Pudding	100	
	Assorted Breads	200	
	Assorted Beverages	200	

USS ALAMO

Day 5

Recipe	Name	No. Portions	Comments
A. Lunch			
	Chicken w/Rice Soup	100	Canned, condensed
Special	Chicken A La King	100	Frozen
Special	Cheese Ravioli w/Spaghetti Sauce	100	Frozen
E–5	Steamed Rice	200	
Q–G–1	Buttered Peas	100	
Q–27	Sauteed Corn	100	
H–4	Cherry Nut Bar	100	
J–25	Vanilla Pudding	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Beef w/Noodle Soup	100	Dehydrated
Special	Grilled Steak	100	Reformed steak (7 oz)
L–144	Newport Fried Chicken	100	
Q–57	Mashed Potatoes	200	
Q–G–3	Buttered Spinach	100	
Q–65	Sauteed Succotash	100	
Special	Strawberry Shortcake	100	Frozen sponge cake
J–8–1	Apricot Crisp	100	
K–16	Whipped Topping	200	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 6

Recipe	Name	No. Portions	Comments
A. Lunch			
	Tomato Soup	100	Canned, condensed
Special	Sloppy Joe	100	Tray Pack
L–124	Tuna & Noodle Casserole	100	
Q–45–1	French Fries	200	
Q–7	Lyonnaise Green Beans	100	
Q–G–1	Buttered Corn	100	
Special	Rhubarb Pie	100	Frozen
H–3	Butterscotch Brownies	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
P–15	Potato Soup	100	
Special	Stuffed Cabbage	100	Frozen
L–41	Swedish Meatballs	100	
Q–52	Rissole Potatoes	200	
Q–G–1	Buttered Green Beans	100	
Q–G–3	Buttered Cauliflower	100	
H–20	Chocolate Chip Cookies	100	
	Assorted Ice Cream	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 7

Recipe	Name	No. Portions	Comments
A. Lunch			
	Minestrone Soup	100	Canned, condensed
L–130	Chicken Cacciatore	100	
Special	Salisbury Steak	100	Frozen
Q–57	Mashed Potatoes	200	
Q–G–3	Buttered Greens	100	
Q–G–1	Black Eyed Peas	100	
G–32	Orange Cake	100	
G–39–5	Orange Icing	100	
Special	Blueberry Pie	100	Frozen
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Bean w/Bacon Soup	100	Canned, condensed
Special	Macaroni & Beef	100	Frozen
L–69	Baked Ham	100	
Q–51–1	Au Gratin Potatoes	200	
Q–G–3	Buttered Peas	100	
Q–G–2	Buttered Cabbage	100	
Special	Apple Crisp	100	Tray Pack
K–16	Whipped Topping	100	
H–17	Hermits	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 8

Recipe	Name	No. Portions	Comments
A. Lunch			
P–25–1	Onion Soup	100	
Special	Chicken A La King	100	Tray Pack
L–16–1	Swiss Steak w/Brown Gravy	100	
Q–77	Parsley Potatoes	200	
Q–G–1	Buttered Corn	100	
Q–10	Broccoli Polonaise	100	
J–20–1	Butterscotch Pudding	100	
Special	Dutch Apple Pie	100	Frozen
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Turkey Noodle Soup	100	Canned, condensed
L–40	Stuffed Peppers	100	
Special	Pork Chop Suey	100	Frozen
E–5	Steamed Rice	200	
Q–G–3	Buttered Spinach	100	
Q–G–1	Buttered Green Beans	100	
I–37	Peach Pie	100	
Special	German Chocolate Cake	100	Frozen
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 9

Recipe	Name	No. Portions	Comments
A. Lunch			
	Tomato Soup	100	Canned, condensed
N–27	Sloppy Joe	100	
Special	Cheese Ravioli	100	Tray Pack
Special	German Potato Salad	200	Tray Pack
Q–G–3	Buttered Lima Beans	100	
Q–17	Carrots Lyonnaise	100	
Special	Lemon Meringue Pie	100	Frozen
	Assorted Ice Cream	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Beef w/Noodle Soup	100	Dehydrated
Special	Sliced Turkey w/Gravy	100	Frozen
Special	Salisbury Steak	100	Tray Pack
Special	Scalloped Potatoes	200	Dehydrated mix
Q–G–3	Buttered Mixed Vegetables	100	
Q–8–1	Beets in Orange Sauce	100	
Special	Yellow Cake w/Chocolate Icing	100	Frozen cake, canned frostin
I–17–1	Blackberry Pie	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

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Day 10

Recipe	Name	No. Portions	Comments
A. Lunch			
	Beef w/Barley Soup	100	Canned, condensed
L–7	Grilled Steak	100	
Special	Swedish Meatballs	100	Frozen
Q–44	Baked Potato	200	
Q–G–3	Buttered Green Beans	100	
Q–20	Fried Cauliflower	100	
Special	Boston Cream Pie	100	Frozen
G–29	Pineapple Upside Down Cake	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Cream of Mushroom Soup	100	Canned, condensed
Special	Chicken Cacciatore	100	Tray Pack
L–35	Baked Meat Loaf	100	
E–4–3	Buttered Noodles	200	
Q–G–3	Buttered Peas	100	
Q–G–1	Buttered Corn	100	
Special	Lemon Crunch	100	Frozen
G–12	Devil's Food Cake	100	
G–39–2	Chocolate Frosting	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 11

Recipe	Name	No. Portions	Comments
A. Lunch			
	Chicken w/Rice Soup	100	Canned, condensed
Special	Chicken Pot Pie	100	Tray Pack
L–24	Stuffed Cabbage	100	
Q–57	Mashed Potatoes	200	
Q–G–3	Buttered Lima Beans	100	
Special	Orange Cake w/Icing	100	Frozen
I–17	Blueberry Pie	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
P–25–1	Onion Soup	100	
L–120	Shrimp Creole	100	
Special	Beef Tips w/Gravy	100	Frozen
E–5	Steamed Rice	100	
Q–46–3	Lyonnaise Potatoes	100	
Q–G–3	Buttered Zucchini	200	
Special	Pumpkin Pie	100	Frozen
G–5	Banana Cake	100	
G–39–1	Banana Cream Frosting	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 12

Recipe	Name	No. Portions	Comments
A. Lunch			
P–26	Tomato Vegetable	100	
Special	Chili	100	Tray Pack
Special	Assorted Mexican Entrees	100	Frozen
Q–75–1	Mexican Fried Beans	200	
Q–G–3	Buttered Broccoli	100	
Q–G–3	Buttered Brussel Sprouts	100	
J–25–1	Banana Cream Pudding	100	
Special	Carrot Cake	100	Frozen
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Minestrone Soup	100	Canned, condensed
Special	Baked Lasagna	100	Tray Pack
L–83	Sliced Pork	100	
O–16	Brown Gravy	100	
Q–45–1	French Fries	200	
Q–G–1	Buttered Green Beans	100	
Q–G–3	Buttered Corn	100	
H–23–3	Oatmeal Cookies	100	
I–50–5	Strawberry Pie	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 13

Recipe	Name	No. Portions	Comments
A. Lunch			
	Chicken Noodle Soup	100	Canned, condensed
Special	Beef Stew	100	Frozen
L–65–3	Grilled Ham Steaks	100	
Special	Home Baked Beans	200	Tray Pack
Q–G–1	Buttered Peas	100	
Q–73	Stewed Tomatoes	100	
Special	Apple Pie	100	Frozen
G–32–4	Coconut Cake	100	
G–39–3	Coconut Cream Frosting	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	New England Clam Chowder	100	Canned, condensed
L–5	Sliced Roast Beef	100	
O–16	Brown Gravy	100	
Special	Seafood Newburg	100	Frozen
E–7–2	Fried Rice	200	
Q–G–3	Buttered Greens	100	
Q–G–1	Buttered Carrots	100	
Special	Chocolate Brownies	100	Frozen
J–8	Peach Crisp	100	
K–16	Whipped Topping	100	
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

USS ALAMO

Day 14

Recipe	Name	No. Portions	Comments
A. Lunch			
	Beef w/Barley Soup	100	Canned, condensed
L–28–1	Chili Mac	100	
Special	Steak Sandwich	100	Reformed steak (4 oz)
Q–45–1	French Fries	200	
Q–G–3	Buttered Succotash	100	
Q–8–1	Beets in Orange Sauce	100	
G–16	Strawberry Shortcake	100	
K–16	Whipped Topping	100	
	Assorted Ice Cream	100	
	Assorted Bread	200	
	Assorted Beverages	200	
	Salad Bar	200	
B. Dinner			
	Cream of Mushroom Soup	100	Canned, condensed
L–131	Chicken and Gravy	100	
Special	Beef in Barbeque Sauce	100	Frozen
M–42	German Potato Salad	200	
Q–G–3	Buttered Cauliflower	100	
Q–G–1	Buttered Green Beans	100	
J–8–2	Cherry Crisp	100	
K–16	Whipped Topping	100	
Special	Chocolate Cream Pie	100	Frozen
	Assorted Breads	200	
	Assorted Beverages	200	
	Salad Bar	200	

APPENDIX B

Modular, Fast-Foodservice Facility:
A Purchase Description

US Army Natick Research and
Development Laboratories

Operations Research and Systems Analysis Office

APPENDIX B

TABLE OF CONTENTS

MODULAR, FAST–FOODSERVICE FACILITY: A PURCHASE DESCRIPTION

The use of this document is restricted by NLABS to the specific purpose for which it was originally furnished.

1. SCOPE

1.1 **Scope.** This purchase description covers one type of self-contained modular fast-food-service facility. Hereinafter, the unit will be identified as the modular facility.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this purchase description to the extent specified herein:

2.2 **Federal Specifications:**

L–P–387A Int. Amend (2) SH	9 Jul 71	Plastic Sheet Laminated, Thermosetting (For Designation Plates)
L–P–390C	10 Aug 71	Plastic, Molding and Extrusion Material, Polyethylene and Copolymers (Low, Medium and High Density)
S–F–695F (2)	21 Aug 78	Fryers, Deep-Fat, Electric
HH–I–558B (3)	24 Aug 76	Insulation Blocks, Boards, Blankets Felts, Sleeving (Pipe and Tube Covering), and Pipe Fitting Covering Thermal (Mineral Fiber, Industrial Type)
NN–P–530E	19 May 77	Plywood, Flat Panel
OO–B–1620	26 Sep 73	Blower, Air Barrier
QQ–A–200/9 (1)	27 Jun 74	Aluminum Alloy Bar, Rod and Shapes, Tube and Wire, Extruded, 6063
QQ–B–654	5 Sep 80	Brazing Alloy, Silver
QQ–S–571E (2)	16 Jul 75	Solder, Tin Alloy, Lead-Tin and Lead Alloy

2.3 **Military Specifications:**

MIL–V–173C	18 Nov 75	Varnish, Moisture and Fungus-Resistant (For Treatment of Communications, Electronic and Associated Equipment)
MIL–D–3156C	17 Apr 67	Drain, Floor Cast Iron
MIL–F–20329	13 Apr 60	Flux, Soldering, Rosin Base, General Purpose
MIL–C–43006E	24 Mar 78	Cloth, and Strip Laminated, Vinyl Nylon, High Strength, Flexible
MIL–H–43895	25 Aug 76	Heater, Sink, Hot Water, Booster Electric

2.4 **Federal Standards:**

FED–STD–595	2 Jan 68	Color

2.5 **Military Standards:**

MIL–STD–461A	1 Aug 68	Electromagnetic Interference
Notice 6	3 Jul 73	Characteristics, Requirement for Equipment
MIL–STD–462	*31 Jul 67*	*Electromagnetic Interference Characteristics,*
Notice 3	9 Feb 71	Measurement of

(Copies of specifications, standards and drawings required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the Contracting Officer.)

2.6 **Other publications.** The following documents form a part of this purchase description to the extent specified herein. Unless a specific issue is identified the issue in effect on date of invitation for bids or request for proposal shall apply:

2.6.1 **American Institute of Steel Construction, Inc., (AISC):** Design, Fabrication and

Design, Fabrication and Erection, Steel Construction, Specification For Steel Buildings and Bridges

(Application for copies should be addressed to the American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, NY 10020.)

2.6.2 **American Iron and Steel Institute (AISI):**

Light Gage, Cold Formed, Steel Design Manual

(Application for copies should be addressed to the American Iron and Steel Institute, 1000 16th Street, NW, Washington, DC 20336.)

2.6.3 **American National Standards Institute (ANSI) Publications:**

A 42.2 Portland Cement and Portland Cement-Line Plastering, Exterior (Stucco) and Interior

A 42.3 Lathing and Furring for Portland Cement and Portland Cement

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018).

2.6.4 **American Refrigeration Institute (ARI):**

ARI 210 Unitary Air Conditioning Equipment

(Application for copies should be addressed to the American Refrigeration Institute, 1815 North Fort Meyer Drive, Arlington, VA 22209).

2.6.5 **American Standards Association (ASA):**

ASA B.1 Screw Threads, latest issue

(Application for copies should be addressed to the American Standards Association, 1420 Broadway, New York, NY 10016).

2.6.6 **American Society of Testing Materials (ASTM):**

A 36 36 Structured Steel, Spec for

A 167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip

A 307 Carbon Steel External and Internally Threaded Standard, Spec for

A 325 High Strength Bolts for Structural Steel Joints Including Suitable Nuts and Plain Hardened Washers

A 366 Steel, Carbon, Cold-Rolled Sheet Commercial Quality, Spec for

A 446 Steel Sheet Zinc Coated (Galvanized) by the Hot Dip Process Structural (Physical) Quality, Spec for

A 500 Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Pounds and Shapes, Spec for

A 513 Electric Resistance-Welded Carbon and Alloy Steel Mechanical Tubing, Spec for

A 525 Steel Sheet, Zinc Coated (Galvanized) by the Hot Dip Process, General Requirements

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103).

2.6.7 **American Welding Society (AWS):**

Standard Qualification Procedure of the American Welding Society

(Application for copies should be addressed to the American Welding Society, 2501 Seventh Street, NW, Miami, FL 33125).

2.6.8 **Metal Building Manufacturers Association (MBMA):**

Design Practice Manual

(Application for copies should be addressed to the Metal Building Manufacturers Association, Thomas Association Inc., 1230 Keith Building, Cleveland, OH 44115).

2.6.9 **National Association Plumbing, Heating and Cooling Contractors:**

National Standard Plumbing Code

(Application for copies should be addressed to the National Association Plumbing, Heating and Cooling Contractors, 1016 20th Street, NW, Washington, DC 20036).

2.6.10 **National Electrical Manufacturers Association (NEMA):**

AB 1 and Rev. 1 & 2	Molded Case Circuit Breakers
LD 1	Fabrication and Installation of High-Pressure Decorative Laminates
CS 1	Sheet-steel Outlet Boxes, Device Boxes, Covers and Box Supports, and Cast Aluminum Covers
WD 1	Outlet Receptacles, Attachment Plug Caps and Appliance Plugs
ICS	Industrial Controls and Systems

(Application for copies should be addressed to the National Electrical Manufacturers Association, 155 East 44th Street, New York, NY 10017).

2.6.11 **National Fire Protection Association (NFPA)**

NFPA 70	National Electric Code
NFPA 96	Installation of Equipment for Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment

(Application for copies should be addressed to the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.)

2.6.12 **National Sanitation Foundation (NSF)**

No. 2	Food Service Equipment
No. 33	Commercial Cooking Equipment Exhaust Systems
No. 35	Laminated Plastic for Surfacing Food Service Equipment
	Seal of Approval Listing of Food Service Equipment
	Manual on Sanitation Aspects of Installation of Food Service Equipment

(Application for copies should be addressed to the National Sanitation Foundation, NSF Building, Ann Arbor, MI 48106.)

2.6.13 **Underwriters' Laboratories, Inc. (UL)**

UL 1 or 6	Conduit Electric
UL 197	Commercial Electric Cooking Appliances
UL 263	Building Construction Fire Resistant
UL 514 Rev	Outlet Boxes and Fittings, Electric

(Application for copies should be addressed to the Underwriters' Laboratories, Inc., 333 Pfingsten Rd., Northbrook, IL 60062; 1285 Walt Whitman Road, Melville, NY 11746; 1655 Scott Boulevard, Santa Clara, CA 95050; or 2602 Tampa East Boulevard, Tampa, FL 33619.)

3. REQUIREMENTS

3.1 **Standard product.** The modular facility (Figure B–1) delivered under this purchase description shall be the manufacturer's commercial product, except for any changes necessary to comply with requirements specified here. All like items furnished on any one contract, including parts and subassemblies thereof, shall be new and interchangeable.

3.2 **Codes and standards.** The modular facility shall comply with the requirements of ARI 210, NEMA, NFPA, National Plumbing Code, NSF No's. 2, 33 and 35, UL, as applicable.

3.2.1 **Compliance.** Prior to commencing production, the contractor shall submit to the contracting officer or his authorized representative satisfactory evidence that the modular facility and components he or she proposes to furnish under this purchase description meets the

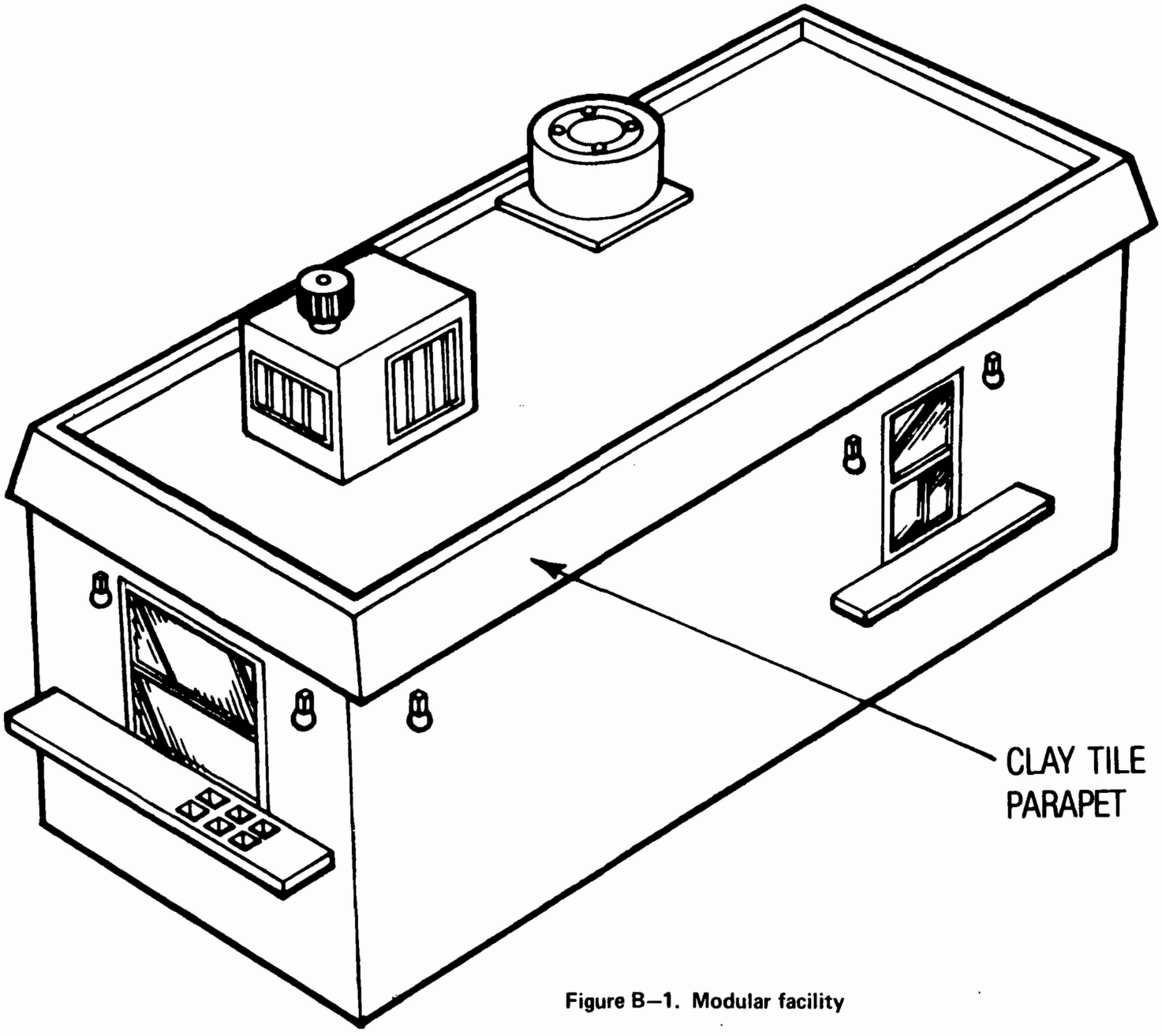


Figure B–1. Modular facility

applicable requirements of ARI No. 210 and NSF Standard No's. 33 and 35, and No. 2, respectively, as follows:

3.2.1.1 **ARI.** Acceptable evidence of compliance with Provisions of ARI 210 shall be a certificate stating the combination evaporator cooler/heater electric unit or air conditioner/heater combination electric unit, as applicable, conforms to the applicable requirements of ARI 210.

3.2.1.2 **NSF.**

3.2.1.2.1 A listing in the current edition of the NSF "Listing of Food Service Equipment" or display of the NSF seal on the finished commercial cooking equipment, exhaust systems, sink and shelving and laminated plastics for surfacing food service equipment, or

3.2.1.2.2 A certification for the commercial cooking equipment, exhaust systems, sink and shelving, and laminated plastics for surfacing food service equipment issued by NSF under their special one-time contract evaluation/certification service, or

3.2.1.3 **Codes and standards requirements.** Acceptable evidence of meeting the applicable requirements of the codes and standards specified in paragraph 2.6 shall be a certified statement that the modular facility and components conforms to the applicable requirements of the above cited codes and standards.

3.3 **Alternate components.** Components offered as equivalent to components specified hereinafter, and on the referenced drawings as a specific manufacturer's part or model number or equal, shall be functionally equal to the manufacturer's model number identified, and of equal or better quality. The incorporation and inclusion of such a component in the design of the specified end product shall not require modification or change to any other specified component, and shall not reduce ease of maintenance to it or any other components, unless such modification or change is specifically approved by the contracting officer. The contractor shall submit for the contracting officer's approval, a list identifying each proposed alternate component, together with proof that each listed component complies with requirements specified above. The contracting officer may require a physical sample of the proposed substitution.

Approval of the submitted listing, together with the necessary supporting data, authorizes commencement of manufacture but does not relieve the contractor of responsibility that these components perform in accordance with specified requirements when incorporated into the end product.

3.4 **Materials and components.** The materials and components used shall conform to the applicable referenced specifications, standards, drawings, and requirements specified herein. Where materials are not definitely specified, they shall be of the quality normally used for the purpose in commercial practice provided the completed items comply with all provisions of this purchase description.

3.4.1 **Steel.**

3.4.1.1 **Steel, structural.** Structural steel shall conform to ASTM A–36.

3.4.1.2 **Steel sheet, zinc coated (galvanized), structural quality.** Structural quality galvanized steel sheets shall conform to not less than grade B (37,000 psi yield) of ASTM A 446.

3.4.1.3 **Steel sheet, zinc coated (galvanized), general.** Steel sheet galvanized general, shall conform to ASTM A 525.

3.4.1.4 **Steel sheets and strips.** Steel sheets and strips shall conform to ASTM A 366.

3.4.1.5 **Carbon steel structural tubing.** Steel tube shall conform to ASTM A 513 or ASTM A 500, as applicable.

3.4.1.6 **Carbon steel fasteners.** Carbon steel fasteners shall conform to ASTM A 307.

3.4.1.7 **High-strength steel fasteners.** High-strength steel fasteners shall conform to ASTM A 325.

3.4.1.8 **Stainless steel plate, sheet and strip.** Stainless steel plates, sheets, and strips shall conform to ASTM A 167.

3.4.2 **Insulation.** Insulation shall be industrial type fiberglass conforming to Form B, type I, class 6 of HH–I–558.

3.4.3 **Laminated plastics.** Laminated plastics shall conform to L–P–378.

3.4.4 **Masonite.** Masonite shall be Masonite Corporation, Dover, OH 44622, standard fire tested product, or approved equal.

3.4.5 **Quarry floor tile.** Quarry floor tile shall be provided and shall conform to American Olean Tile Co., 675 California Rd., Quakertown, PA 18951, Color – Canyon Red or equal.

3.4.6 **Prefinished panels.** Prefinished panels for the ceiling shall conform to Marlite Division of Masonite Corp., Dover, OH 44622, Model C–63–FT – Color – Polar White, and the wall panels shall conform to Marlite No. FT–II – Color – Golden Teak or equal.

3.4.6.1 **Prefinished moldings.** Prefinished moldings shall conform to Marlite Division of Masonite Corporation, Dover, OH 44622, Model No.'s as follows:

Ceiling	Item	Walls
No. M851–AW 176	Corner – Inside	No. 451–9035
No. M865–AW 176	Division Molding	No. 465–9035
No. M870–AW 176	Edging	No. 470–9035

or equal. Color for all ceiling and wall moldings to be Polar White and Golden Teak or equal, respectively.

3.4.6.2 **Cove base.** Cove base shall be provided and shall be Flexco Div. Textile Rubber Co., P.O. Box 553, 1000 E. 6th Street, Tascumbia, AL 35674, Model No. 22–6, Color – Chocolate Brown.

3.4.7 **Components.** The following components, as specified herein shall be provided with each modular facility.

3.4.7.1 **Fryer, deep-fat, electric.** Three electric deep-fat fryers batteried with a cabinet incorporating a filtering system shall be provided. The filtering system shall be of a semi-automatic type with a wash down unit, filter unit and switch(es). The cabinet with the filtering system shall be located at the right end of the batteried fryer unit. The batteried fryer unit shall be the Frymaster Corp., 5000 Hollywood Ave., Box 8618, Shreveport, LA 71108, Model No. 322EF2LSC (with 2 sets of casters). Dimension O/A width 46 7/8", depth 31 1/2", and height 45 1/2".

3.4.7.2 **Filter grease.** A grease filter shall be provided and shall be a component of the batteried fryer unit (see 3.4.7.1).

3.4.7.3 **Broiler, conveyor.** A conveyor broiler shall be provided and shall be NEICO Div. of NPI Corp., 887 Mitten Rd., P.O. Box 4506 Burlingame, CA 94010, Model No. 524. Capacity 500–4 oz. frozen beefburgers per hour. Dimensions O/A width 35", depth 30", and height 28".

3.4.7.4 **Oven microwave.** One microwave oven shall be provided and shall be Litton Microwave Cooking, P.O. Box 9320 Minneapolis, MN 55440, Model No. 80/80. Dimensions O/A are width 28 3/16", depth 23 3/8", height 24 5/16". Cavity width 24", depth 14", height 10" (usable space).

3.4.7.5 **Cabinet, hot holding, insulated.** A hot-holding insulating cabinet shall be provided and shall be Cresent Metal Products, Inc., 12711 Taft Ave., Cleveland, OH 44108, Model No. H–138–CDD–1834 or equal. Dutch doors are to be provided and the doors to be right side hinged. Dimensions O/A are width 23 3/16", depth 33 1/2", and height 69 3/4".

3.4.7.6 **Display unit, heated.** A heated display unit with a base cabinet shall be provided and shall be G.A. Systems, Inc., P.O. Box 1382, Huntington Beach, CA 92647, Model No. HD (display unit) and D5 (base cabinet less lids).

3.4.7.7 **Freezer, undercounter, self-contained.** An undercounter, self-contained freezer with a tabletop work area shall be provided and shall be Traulsen and Co., Inc., 114–02 15th Ave., College Point, NY 11356, Model No. RUF 2–32WSC. Capacity to be 18.7 cu. ft. Refrigeration unit to be located at the left end of the freezer (when viewing doors). Dimensions O/A width 79 3/8", depth 35", and height 34".

3.4.7.8 **Hood vent.** One adequate canopy hood type exhaust hood covering all cooking equipment in accordance with NFPA 96 will be provided. The hood vent shall incorporate an automatic dry chemical system. In addition, one 25-pound dry chemical extinguisher shall be provided and mounted in an appropriate location.

3.4.7.9 **Dispenser, carbonated beverage.** A carbonated beverage dispenser shall be provided and shall be Victor Division of Reed Industries, 1445 Rock Mountain Blvd., Stone Mountain, GA 30083, Model No. VPH 204D (Saturn IV). Capacity to be 500–6 oz. drinks/hr at 40°F water temperature or below and 75°F temperature for both product and ambient. Ice bank capacity to be 45 lbs. Dimensions O/A width 19 3/8", depth 25 1/4", and height 30 7/8".

3.4.7.10 **Ice-maker dispenser unit.** Two each ice-maker dispenser units shall be provided and shall be Scotsman Queen Products, Division King-Seeley Thermos, Co., 505 Front Street, Alberta Lea, MN 56007, Model No. HQD 750 WE–1B with Model No. SPKHD 7 stainless steel panel kit for each unit. Each unit shall be provided with a water dispenser attachment. The capacity of each unit shall be 528 lbs. of hard ice per 24 hr. period (70°F water temperature and 90°F ambient). Bin capacity 90 lbs. per unit. Dimensions O/A are width 35 3/16", depth 27 1/2", and height 51 3/8".

3.4.7.11 **Refrigerator/freezer, upright, self-contained, 2-sections.** One upright, self-contained, 2-section refrigerator/freezer combination unit shall be provided. The unit shall be provided with 1/2 doors and shall be Traulsen and Co., Inc. 114–02 15th Ave., College Point, NY 11356, Model No. RDT–2–32 WUT. Total capacity to be 45 cu. ft. with refrigerator capacity of 23.2 cu. ft. and freezer capacity 21.8 cu. ft. Dimensions O/A width 58", depth 34 15/16" and height 51 3/8".

3.4.7.12 **Display case, counter, refrigerated.** A counter model refrigerated display case shall be provided and shall be Progressive Corp., 101 Buck Rd., P.O. Box 288, Feasterville, PA 19047, Model No. CD–24. Capacity to be 6 cu. ft. Dimensions O/A are width 24", width 21 1/2", and height 34 ± 1".

3.4.7.13 **Sink, 3-compartment.** A three compartment stainless steel sink conforming to NSF No. 2 shall be provided and shall be Metal Masters Foodservice Equipment Co., 655 Glenwood Ave., W. Smyrna, DE 19977, Model No. 1848–3 or equal. Unit shall be NSF approved and be fabricated of not less than 16 gauge, 300 series stainless steel. Dimensions O/A are width 51", depth 21 1/2" (front to back) and height 34 ± 1". Each sink shall be provided with a 2" combination drain and overflow assembly Kenco Products Corp., The Kenco Bld., 153 South Dean St., P.O. Box 630, Englewood, NJ 07631, Model No. D 53 or equal.

3.4.7.14 **Faucet, mixing.** Two mixing faucets shall be provided and shall be T&S Brass and Bronze Works, Inc., 128 Magnolia Ave., Westbury, NY 11590, Model B233, or equal. The mixing faucet shall be a wall-mounted type with soap dish unit.

3.4.7.15 **Sink covers.** Three sink covers, one for each sink compartment, shall be provided. These units shall be so constructed that they provide a flat working surface when placed on the sink and easily removable if one compartment was to be used. They shall be made from virgin high density copolymer material conforming to type I, class H, grade 5 of L–P–390. The thickness shall be not less than 3/4 of an inch.

3.4.7.16 **Grease separator.** One grease separator shall be provided and shall be Josam Manufacturing Company, East Highway US 12, Michigan City, IN 46360, Model JA–6, or **equal.** The grease separator is floor mounted, as shown in Figure B–8.

3.4.7.17 **Heater, water.** One electric water heater shall be provided and shall be Ruud Water Heater Division City Investing Co., 5780 Peachtree Dunwoody Rd., N.E. Atlanta, GA 30424, Model No. RP 20P4–1, 208V, 6 kW element with 25-gallon per hour 100°F temperature rise or equal. Dimensions: Diameter 18 7/16" and height 24 7/8".

3.4.7.18 **Counter.** A counter shall be provided and shall be 36" high by 24" deep and the length shall be as required. The countertop shall be fabricated from not less than 18 gauge stainless steel in accordance with paragraph 3.4.1.8. The inside corner where the counter and wall meet shall be sealed with caulking compound. The caulking compound shall be NSF approved for food contact zone areas and shall conform to 3.4.7.31.6. The counter shall be of rigid construction and shall be provided with one inch square tubing.

3.4.7.19 **Shelving.** Shelving conforming to NSF No. 2 shall be provided wherever possible, in the modular facility for storage. The shelving shall be Metropolitan Wire Goods Corp., Wilkes-Barre, PA 18705, Model No. 18 (length in inches) NS or equal. Mounting brackets to be provided for mounting shelves in the modular facility.

3.4.7.20 **Serving shelf.** A one piece stainless steel serving shelf shall be provided and shall be Metal Masters Foodservice Equipment Co., Inc., 655 Glenwood Ave., West Smyrna, DE 19977, Model No. WS 1296–14–3 or equal, except that shelf ends and front to be turned down 1–1/2". The shelf shall be provided with six cut-outs (see Figure B–7) to accept 1/9 size pans (Vollrath Co., Model No. 2094–5 or equal). The six cut-outs are to be located in close proximity to the serving window so that replenishment of condiments could be made from the inside of the modular facility.

3.4.7.21 **Floor drain.** Two floor drains shall be provided and shall be 6" square with a 2" outlet conforming to MIL--D–3156. The floor drains shall be accordance with requirements specified on Figure B–7 and shall be located 8' and 22' from the front and 5' from the sides and shall be connected to the modular facility drain system.

3.4.7.22 **Air conditioner-heater combination unit.** An air conditioner/heater combination electric unit shall be provided and shall be Singer Manufacturing Co., 401 Randolph St., Red Bud, IL 62278, Model No. R–H/D 532024 or equal. Unit shall be rated at five tons cooling capacity in accordance with ARI Standard 210. The unit shall be placed on the modular facility with appropriate duct work to provide balanced air distribution throughout the area to be served so that maximum circulation of conditioned air can be had before it is discharged through the exhaust hood.

3.4.7.23 **Ventilator.** Ventilator shall be provided and shall be ILG Industries, Inc., 2850 No. Pulaski Rd., Chicago, IL 60641, Model No. UBC 165 (1/3 HP @ 1200 rpm), or equal.

3.4.7.24 **Pans, insert and covers.** Thirty-six insert pans and covers shall be provided and shall be Rubber Maid Commercial Products, Inc., 3124 Valley Ave., Winchester, VA 22601, Model 3491 and 3494 or equal, respectively.

3.4.7.25 **Door.**

3.4.7.25.1 **Exterior door.** One exterior hollow steel door shall conform to Fenestra Division of Marmon Group, Inc., 4051 W. 20th St., Erie, PA 16505, Model No. 307OF, or equal.

3.4.7.25.2 **Closet door.** One exterior hollow steel door shall be provided and shall conform to Fenestra Division of Marmon Group, Inc., 4051 W. 20th St., Erie, PA 16505, or equal.

3.4.7.25.3 **Screen door.** One heavy duty, anodized, screen door shall be provided and shall conform to Kane Mfg. Corp., 515 N. Fraley St., Kane, PA 16735, Model No. 20, or equal.

3.4.7.26 **Baskets.** Three slanted baskets shall be provided. The baskets shall be made of steel rods using 1/4" rod on the top periphery with #6 and #12 wire combined on the sides and bottom for maximum strength. The basket shall be nickel plated and shall conform to Metropolitan Wire Goods Corp., Wilkes-Barre, PA 18707, Model 9606, or equal.

3.4.7.27 **Waste receptacle.** Two waste receptacles shall be provided and shall be Lakeside Manufacturing Inc., 19775 Allis St., Milwaukee, WI 53207, Model No. 105, or equal.

3.4.7.28 **Menu board.** One menu board with changeable letters and for outside use shall be provided. The menu board shall be furnished with a full length hinged glass door, lock and keys, and a fluorescent light. Two complete sets of gothic style letters shall be provided with one set of letters the 1" size and the other set of letters the 1/2" size. The menu board shall be A.C. Davenport and Sons Co., 306 East Helen Road, Palatine, IL 60067, Model No. K–100FL (with natural anodized satin finish) or equal. Dimensions O/A width 24", length 36".

3.4.7.29 **Voice communication system.** One complete voice communication system shall be provided and shall include two voice activated switch box (customer speaker microphone unit to be used by the cashier), audio amplifier, internal operator microphone and other applicable components, the complete voice communication system shall be Mosler System Division, 415 Hamburg Turnpike, Wayne, NJ 07470, Model ODERVOX, or equal.

3.4.7.30 **Cash register.** One cash register shall be provided and shall be Victor Business Products, 3900 Rockwell St., Chicago, IL 60618, Model No. 511, or equal.

3.4.7.31 **Hardware.**

3.4.7.31.1 **Dead lock key operated.** One key operated dead lock shall be provided and shall conform to Russwin Division of Emhard, 225 Episcopal Rd., Berlin, CT 06037, Model No. Type 1403, or equal.

3.4.7.31.2 **Knob and shaft.** Exterior and closet doors shall be provided with a knob and shaft units conforming to Russwin Division of Emhard, 225 Episcopal Rd., Berlin, CT 06037, Model No. Beacon No. 3–3832 for the knob and 5/8" shaft Rose No. 3–3932 for the shaft, or equal.

3.4.7.31.3 **Hinges steel.** Each door shall be provided with three full mortise type steel hinges conforming to Stanley Works, New Britain, CT 06050, Model No. F–179, or equal.

3.4.7.31.4 **Window locks.** Each window shall be provided with window locks conforming to Stanley Works, New Britain, CT 06050, Model No. 709, or equal.

3.4.7.31.5 **Mastic.** Mastic shall be provided and shall be fire tested conforming to Masonite Corp., Dover, OH 44622, No. FT–850, or equal.

3.4.7.31.6 **Caulking compound.** Caulking compound shall be provided and shall be fire tested conforming to Masonite Corp., Dover, OH 44622, No. C627FT, or equal.

3.5 **Design and construction.** The design and construction for the modular fast-food service facility shall be as specified herein and as shown on Figures B–1 through B-–10. The modular facility shall be designed as a self-contained compact unit with provisions ready for connection to electrical, water, and waste utilities, as applicable. All terminal fittings required for connection to electricity, water, and waste utilities shall be made externally at the rear of the modular facility. All electrical wiring and piping shall be concealed in the walls, floor, or ceiling as specified herein. The completely assembled modular facility shall be provided with foodservice equipment as specified herein and in Table B–I. The design and construction of the modular facility shall consist of a base; steel frame sides, totally enclosed, except for doors and windows. The roof line of the modular facility shall be of the mansard style. The overall dimension shall be 30' long by 10' wide by 12' high (including exhaust fan). Rough-in for utilities shall be as shown on Figures B-7 and B–8. The wall area under the hood shall be provided with stainless steel panels, i.e., the wall at the rear of the broiler and fryers and the side wall to the right of the fryers. The stainless steel panels shall extend from the hood to the floor. The panels shall be fabricated of 300 series, 18-gauge stainless steel. All joints and seams shall be sealed.

Table B–1. Kitchen equipment

Item No.	Description	Specification	Quantity	Facilities
1.	Sink, Covers	L–P–390 (see 3.4.7.15)	3	––
2.	Heater, Sink, Hot Water Booster (Elect.)	MIL–H–43895 (except kW rating shall be 4kW)	1	208 V 4 kW
3.	Blower, Air Barrier	00–B–1620 type I	1	115 V

3.5.1 **Loading.** All normal design loads and combination of loads for purposes of designing structural requirements shall comply to local building codes and the following:

a. Floor load – Floor shall sustain, in addition to all dead loads, minimum accepted live load of 100#/sq ft without damage or permanent distortion.

b. Roof load – Roof shall sustain, in addition to all dead loads on flat roof without damage or permanent distortion, a minimum accepted live load of 30#/sq. ft. Live loads shall be assumed to act vertically upon the area projected upon a horizontal plane.

c. Combination loads – The combining of normal loads and auxiliary loads for design purposes shall be without damage or permanent distortion.

3.5.2 **Welders.** Prior to assigning any welder on structural welding on modular facility to be furnished under this purchase description, the contractor shall provide the contracting officer or his authorized representative with the list of welders to be employed in the work, together with certification that each of these welders has passed qualification tests as prescribed by either of the following listed codes.

a. Standard Qualification Procedure of the American Welding Society.

b. Welding Qualification of the American Society of Mechanical Engineers.

3.5.3 **Base.** The base shall consist of base channel, cross channel, formed steel floor, fire tested masonite, and ceramic tile flooring in accordance with requirements specified on Figure B–2. The base channel shall be located all around the periphery forming the outside of the base and shall be fabricated from C8 x 11.5 structural "U" channel as specified in 3.4.1.1. The base channel shall be provided with four mounting bolt holes located 1' from each end along the long side of the modular facility. Mounting bolt access panels shall be 1' square and located in the inside of the modular facility 1' in from each inside corner (centerline of panel). Cross channel shall be provided and shall be located 2' on centers. Cross channel shall be fabricated from C4 x 7.25 structured "U" channel as specified in 3.4.1.1. Each end of the cross channel shall be welded to the base channel on both sides of the webb with a 5/16" fillet weld. A formed steel floor shall rest on top of the cross channels. The formed steel floor shall be fabricated from 19-gauge (.042") steel as specified in 3.4.1.2, and shall be secured to the cross channels by welding. Masonite shall rest on top of the formed floor. The masonite shall be as specified in 3.4.4 and shall be 3/8" in thickness. Masonite shall be secured to the formed steel by pull-type rivets. Quarry tile flooring as specified in 3.4.5 shall be placed over the masonite floor, and shall be not less than 3/8" in thickness.

3.5.4 **Frame.** Metal frame for the sides of the modular facility shall consist of four tube corners, verticle "C" channel, door frames, window frame, formed steel panels, bottom and top channel. Frame bottom shall be fabricated from 16 gauge (.065) x–1/2" x 1–1/2" L channel steel as specified in 3.4.1.2. The frame bottom shall be welded to the top of the base channel and formed steel floor. Construction shall be in accordance with requirements on Figure B–2 and B–3. Corners shall be fabricated by 3" x 3" x 1/3" thick steel square

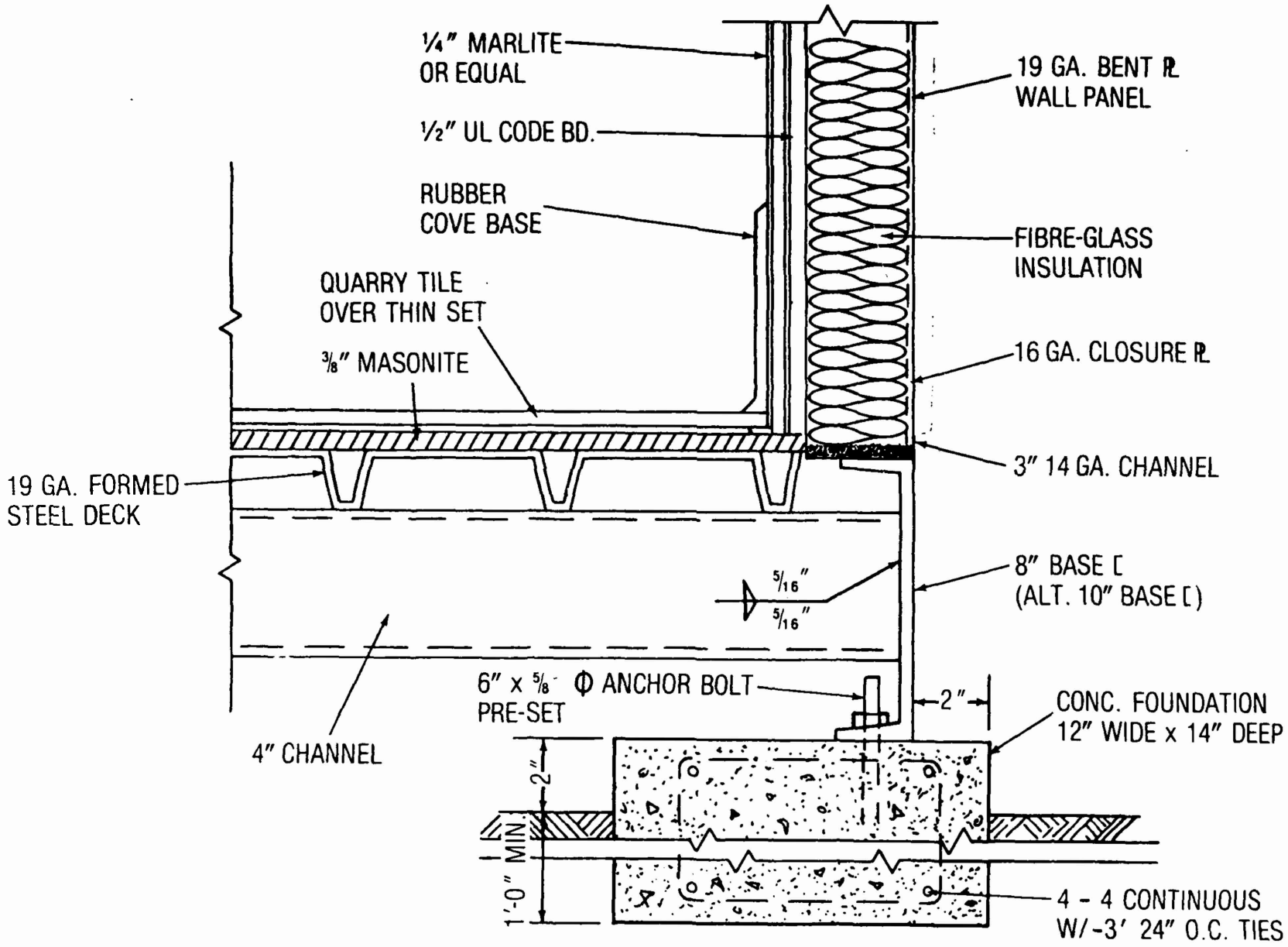
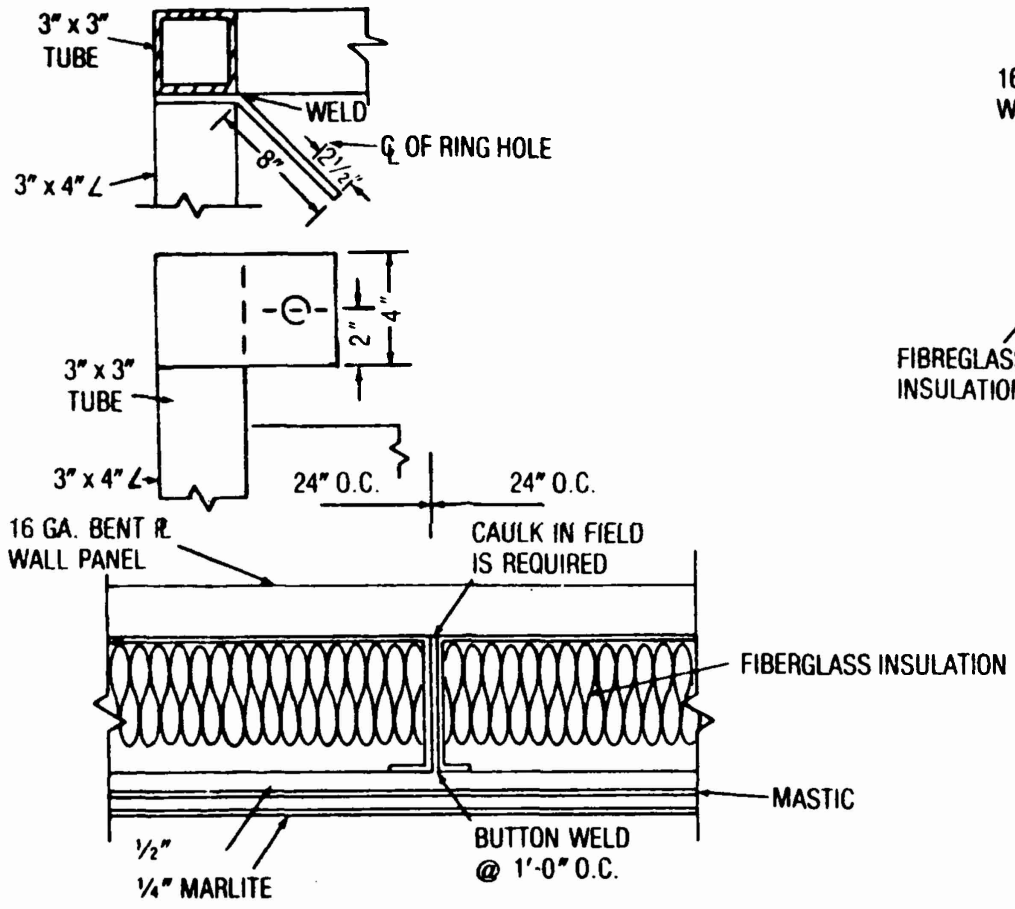
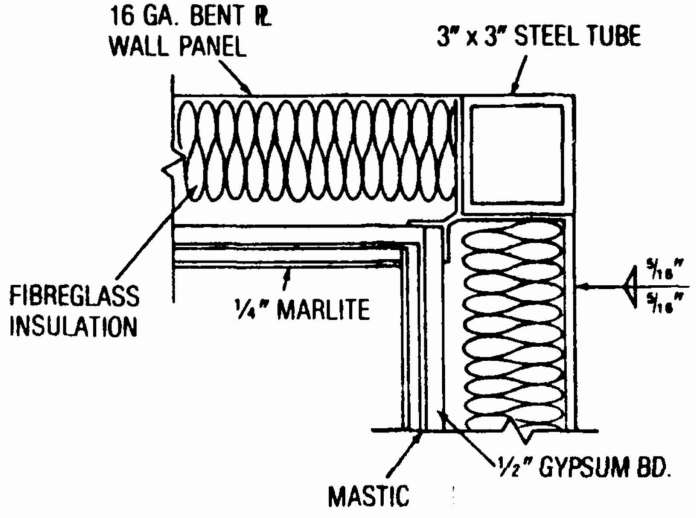


Figure B–2. Base requirements



TYPICAL WALL (HORIZ. SECTION)



TYPICAL CORNER

Figure B–3. Typical wall and corner

tubing as specified in 3.4.1.5. Top channel shall be located all around the periphery forming the metal frame. The top frame shall be fabricated from 3–1/2" x 3–1/2" x 1/4" L angle steel as specified in 3.4.1.1. Verticle "C" channels shall be fabricated from 14 gauge (.075) 3C 6.0 steel as specified in 3.4.1.1. Verticle channels shall be used around the door and window frame as required, and welded to top and bottom frames. The formed steel panels shall be 16 gauge (.065) metal siding as specified in 3.4.1.4. The panels shall be 3–1/2" x 1" x 2' and welded to the top channel and bottom frame.

3.5.4.1 **Doors.** The modular facility shall be provided with two metal steel doors, of the hollow type. One steel door shall be located at the rear end of the modular facility and the other steel door shall be located in the interior for the closet. The exterior steel door shall be 42" wide by 7' high by 1–1/2" thick, and the closet door shall be 30" wide by 7' high by 1–1/2" thick. The doors shall be fabricated of 20 gauge (0.0369 inch) steel and shall have the manufacturer's standard finish. Construction of the door units and doors shall be in accordance with requirements specified on Figure B–4. The exterior door shall be provided with a key-operated security lock as specified in 3.4.7.31.1. Three full mortise steel butt hinges shall be provided for the exterior and closet doors. The hinges shall be 4 x 3 x 1/2 inches and shall be located 1' from the top and bottom of the door and one located in the center of the other two. The hinges shall be as specified in 3.4.7.31.3. The deadlock and knob and shaft unit shall be as specified in 3.4.7.31.1 and 3.4.7.31.2 respectively. A screen door shall be provided and shall be as specified in 3.4.7.25.3 and shall be 42" wide by 7' high by 1–1/8" thick. The screen door shall swing inwards opposite the exterior door.

3.5.4.2 **Window.** A 3' by 3' window with a removable screen shall be provided at the front of the modular facility. The left side of the modular facility shall be provided with a 3' by 2' window with a removable screen. Window locks as specified in 3.4.7.31.4 shall be provided on each of the serving windows. All glass shall be 1/4" polished plate tempered glass. Construction of the window units, i.e., rough framing, window frame, window sills and removable screens shall be in accordance with requirement specified on Figure B–5. The window rough framing (see Figure B–5) shall be fabricated of 2' x 4' x 1/4' tube steel as specified in 3.4.1.5.

3.5.5 **Roof assembly.** The roof assembly shall consist of formed steel panels, vapor barrier (plastic film), two-ply 15 lb. felt, asphalt roofing and canopy. The formed steel panels shall be fabricated of 16 gauge (.065) steel as specified in 3.4.1.4. The panels shall be 3–1/2" x 1" x 2' and shall be welded to the top channel. The vapor barrier (plastic film) shall be 6 mil polyethylene major barrier in conformance to L–P–387 and laying on the steel panels and canopy (see Figure B–6). Mastic shall be placed between the vapor barrier and asphalt roofing. The mansard style canopy shall be provided all around the top of the modular facility. The canopy shall be provided with 19 gauge (.042 inch) "L" channel flashing all around the inside top of the canopy, securing the vapor barrier and two-ply 15 lb. felt to the canopy. The "L" channel flashing shall be secured with 5/16" pop rivets at a distance of 6" spacing around the canopy. All roof and soffit panels, ridge cover, gable flashing, wall caps, fascia, flashing for roof penetration, etc., shall be fabricated from grade B steel specified in 3.4.1.2. Construction of the roof assembly shall be in accordance with requirements specified in Figure B–6. Mansard canopy shall be covered with red clay Spanish roofing tile to match red roof tile on adjacent barracks complex.

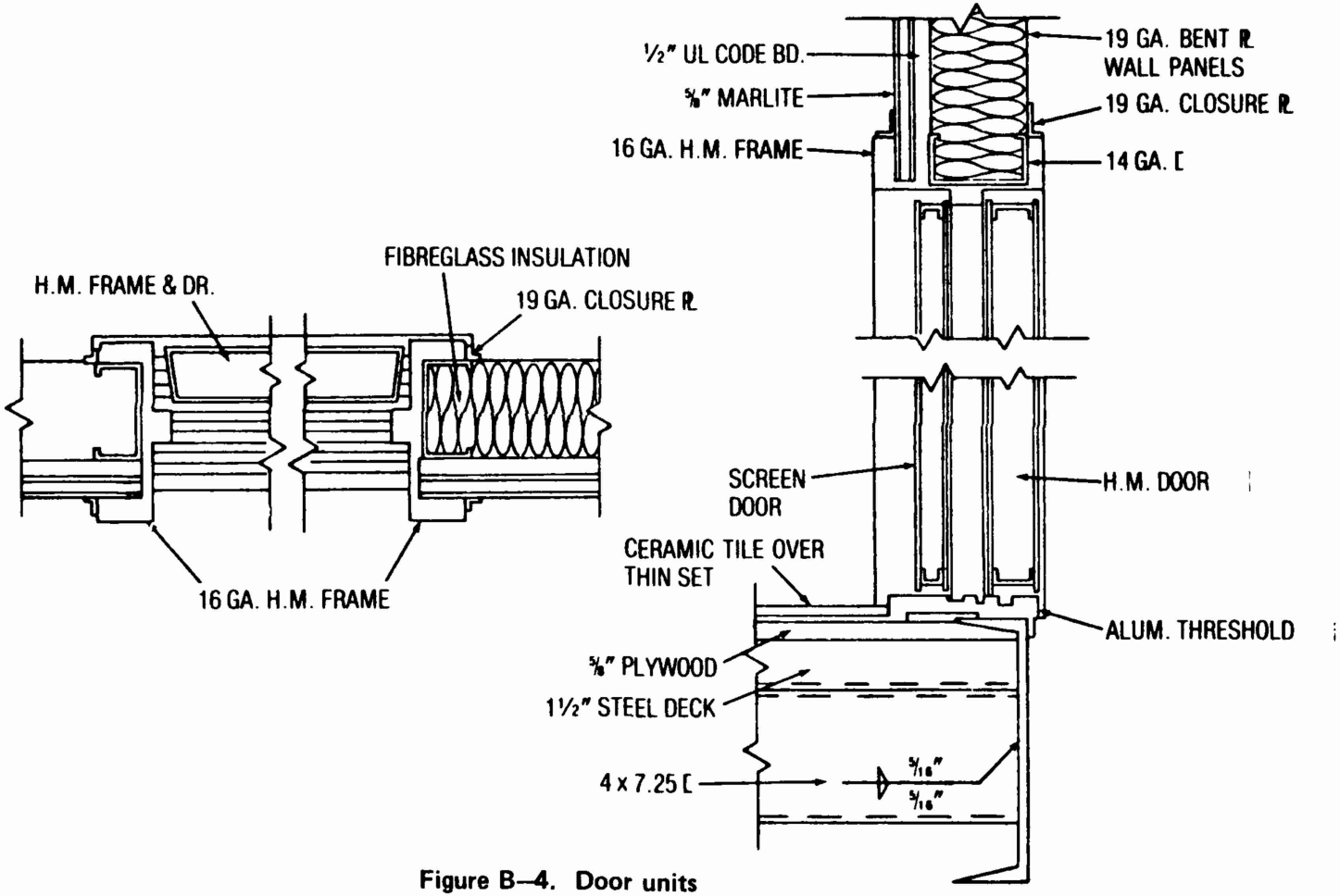


Figure B–4. Door units

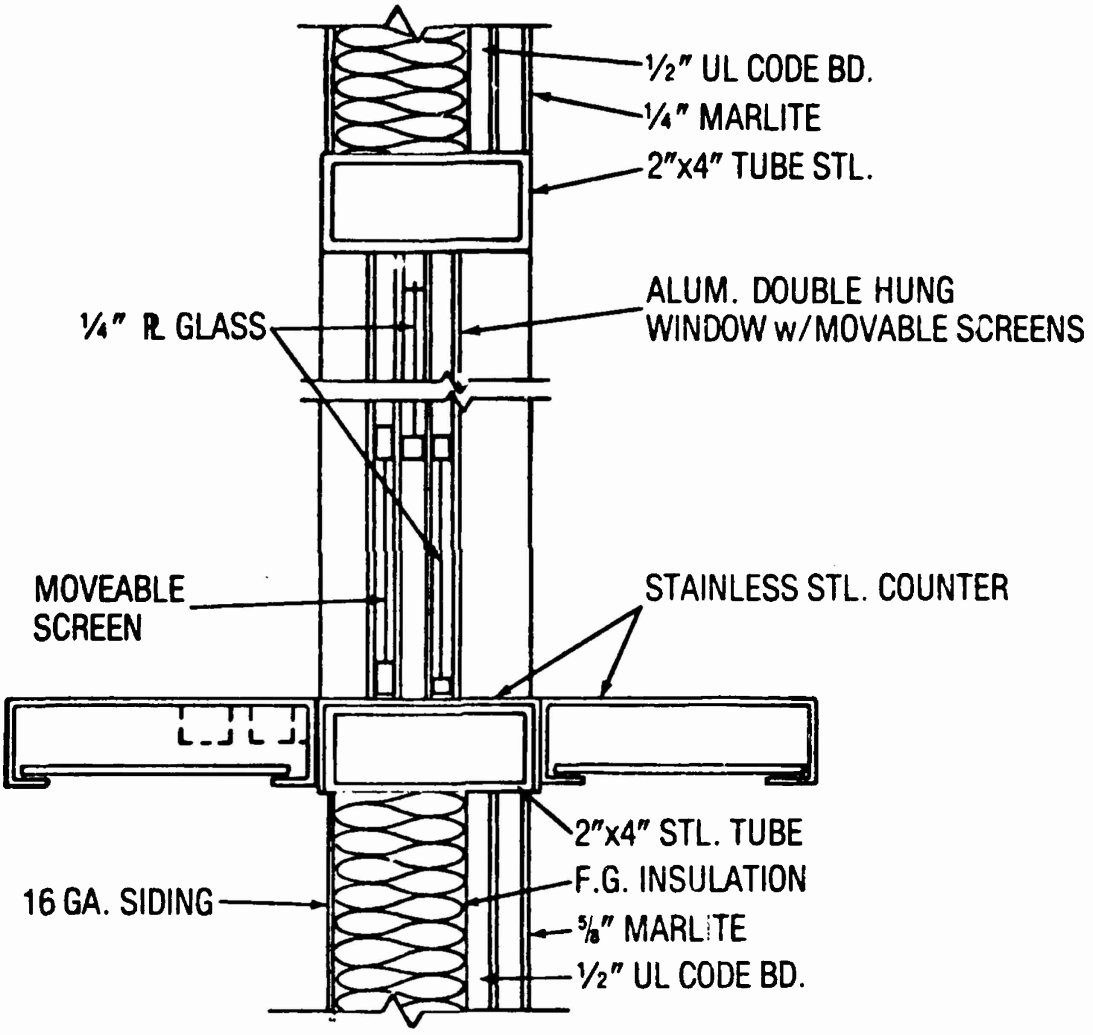


Figure B–5. Window unit

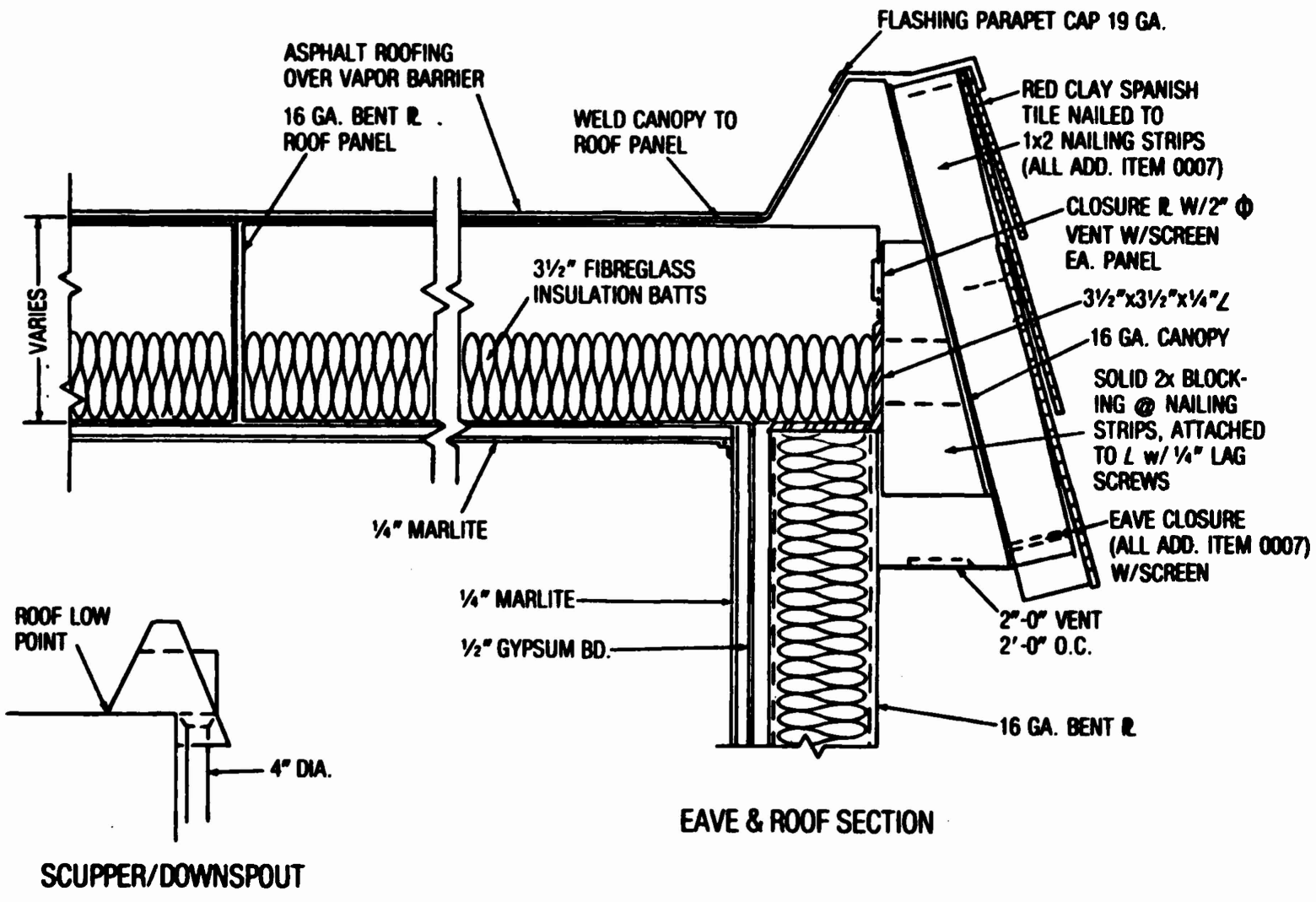


Figure B–6. Roof assembly

3.5.5.1 **Scupper and downspout.** One scupper and one downspout shall be provided with the modular facility and shall be fabricated from galvanized steel specified in 3.4.1.3. Scupper material thickness shall be not less than 24 gauge (.028 inch) and the downspout shall be not less than 28 gauge (.019 inch). The scupper shall be 10" high by 6" wide with transition to a 4" round downspout. The scupper shall be located level with the lowest point of roof and top of same shall be located 4" below top of canopy as shown on Figure B–6.

3.5.6 **Insulation installations.** Insulation shall be installed in the space between the metal outer wall and panel inner wall and space above ceiling in accordance with requirements specified in Figure B– 2 and B–3. Insulation shall be a minimum of 3–1/2" foil back industrial-type fiberglass as specified in 3.4.2. Insulation shall be installed with fire tested mastic as specified in 3.4.7.31.5, so that it does not settle or be displaced during shipping, testing, or operation.

3.5.7 **Fasteners.** Steel machine bolts and nuts shall be fabricated from carbon steel specified in 3.4.1.6. High strength steel fasteners shall be fabricated from inner walls and ceiling to the steel outer panels.

3.5.8 **Threaded rod ends.** Threaded rod ends shall conform to the applicable requirements of American Standards Association (ASA) B.1.

3.5.9 **Interior.** The interior of the modular facility, i.e., inside walls including closet interior walls and ceiling shall be fire-tested marlite panels as specified in 3.4.6. The panels shall be in accordance with the requirements of Figures B–3 and B–6. Prefinished moldings shall be as specified in 3.4.6.1 and shall match the panels. The moldings shall be used at all joints. The installation of panels shall be installed in accordance with UL AW 146 and applied with the fire tested, mastic specified in 3.4.7.31.5. The rubber cove base shall be in accordance with the requirements specified on Figure B–2 and shall be as specified in 3.4.6.2. The code board shown on Figures B–3 and B–6 shall be secured by pop-type rivets at 2" centers and the panels shall be secured to the code board with mastic (see 3.4.7.31.5). The closet shall be as shown on Figure B–7 and shall be provided with a 17" x 19" x 3/16" steel access panel. Figures B–8 and B–9 display the remaining interior layout. A front view is in Figure B–10.

The cashiers station is located between the closet and sink unit. The cashier shall be protected from the sinks by a partition located at the left end of the sink unit. The partition is to be of a rigid construction and be fabricated of 300 series stainless steel 16 gauge (min). The partion size to be 48" high by 24" deep. The closet wall to be provided with a removable shelf to support the cash register specified in 3.4.7.30. The wall shall also be provided with a 17" by 14" opening so that the cashier can have access to the cash register. The opening shall be furnished with a door to secure the cash register whenever it is not in use. Unit drains to be plumbed to drain lines.

3.5.10 **Locking devices.** Each caster mounted unit, i.e., fryer, and hot-holding cabinet specified herein, shall be provided with locking devices located at the front of each unit. The locking devices shall be of the quick release type and shall be readily accessible. The locking devices shall secure the units to the units, back wall and when released shall allow for movement of the unit during clean-up periods.

ITEM LIST TO FIGURES B–7, B–8, B–9, B–10

ITEM		REFERENCE	
No.	Description	Table B–1	Paragraph
1	Fryer, Deep-Fat, Electric	—	3.4.71
2	Filter, Deep-Fat	—	3.4.7.2
3	Broiler, Conveyor	—	3.4.7.3
4	Oven, Microwave	—	3.4.7.4
5	Cabinet, Hot-Holding, Insulated	—	3.4.7.5
6	Display Unit, Heated	—	3.4.7.6
7	Freezer, Undercounter, Self-Contained	—	3.4.7.7
8	Hood, Vent	—	3.4.7.8
9	Dispenser, Carbonated Beverage	—	3.4.7.9
10	Icemaker, Dispenser w/Water	—	3.4.7.10
11	Refrigerator/Freezer, Upright Self-Contained, 2-Sections	—	3.4.7.11
12	Display Case, Counter, Refrigerated	—	3.4.7.12
13	Sink – 3 Compartments w/Combination Drain and Overflow	—	3.4.7.13
14	Faucet, Mixing	—	3.4.7.14
15	Sink Covers	1	3.4.7.15
16	Grease Separator	—	3.4.7.16
17	Heater, Water	—	3.4.7.17
18	Heater, Sink, Hot Water, Booster, Electric	2	—
19	Counter	—	3.4.7.18
20	Shelving	—	3.4.7.19

ITEM LIST TO FIGURES B–7, B–8, B–9, B–10 (cont'd)

ITEM		REFERENCE	
No.	Description	Table B–1	Paragraph
21	Serving Shelf	—	3.4.7.20
22	Drain, Floor	—	3.4.7.21
23	Air Conditioner/Heater Combination Unit	—	3.4.7.22
24	Ventilator	—	3.4.7.23
25	Pans, Insert and Covers	—	3.4.7.24
26	Baskets	—	3.4.7.26
27	Waste Receptacle	—	3.4.7.27
28	Voice Communication System	—	3.4.7.29
29	Cash Register	—	3.4.7.30
30	Blower Air Burner	3	—
31	Closet	—	3.5.4.1 & 3.5.9
32	Locking Device for Caster Equipment	—	3.5.10

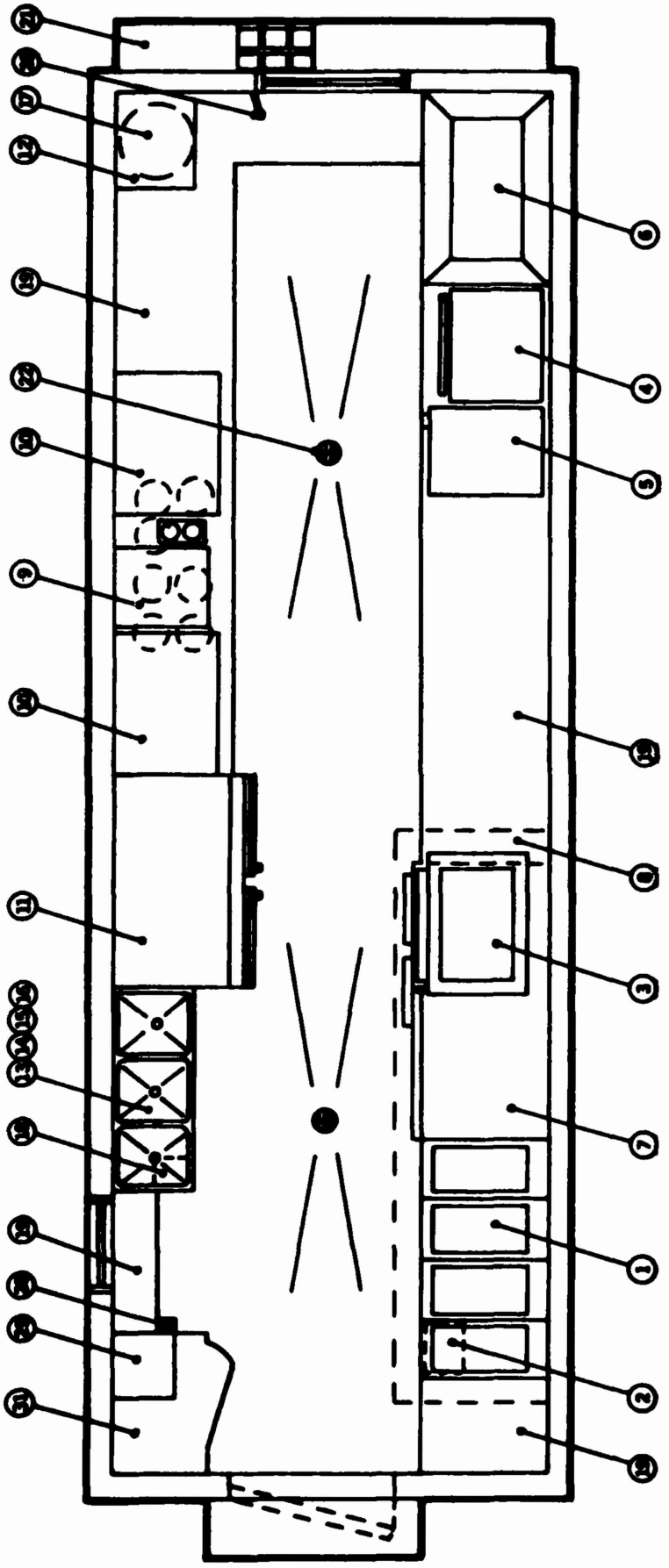


Figure B–7. Modular unit, top view (see item list)

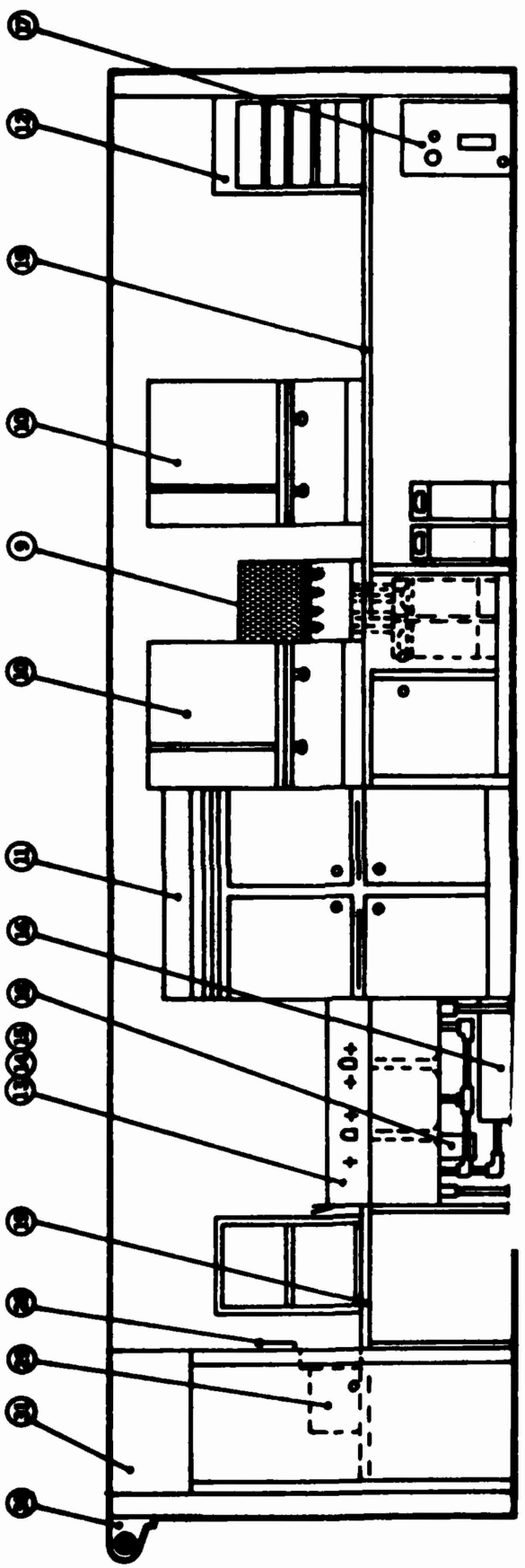


Figure B–8. Modular unit, left side (see item list)

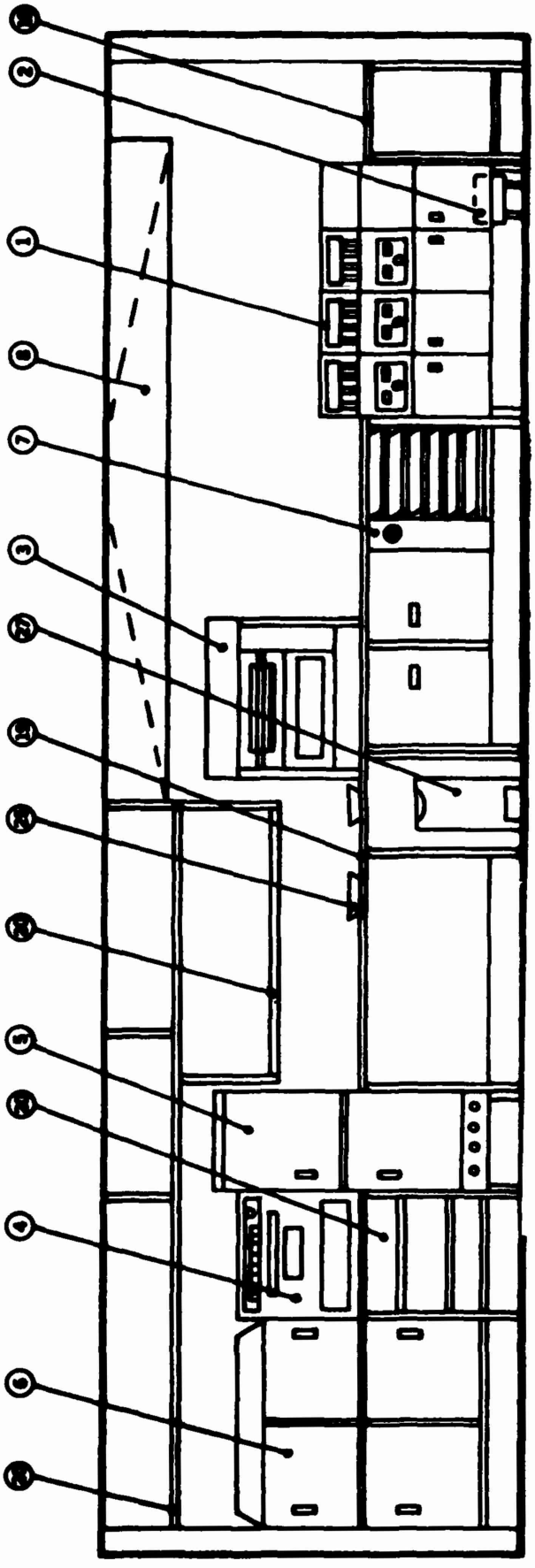


Figure B–9. Modular unit, right side (see item list)

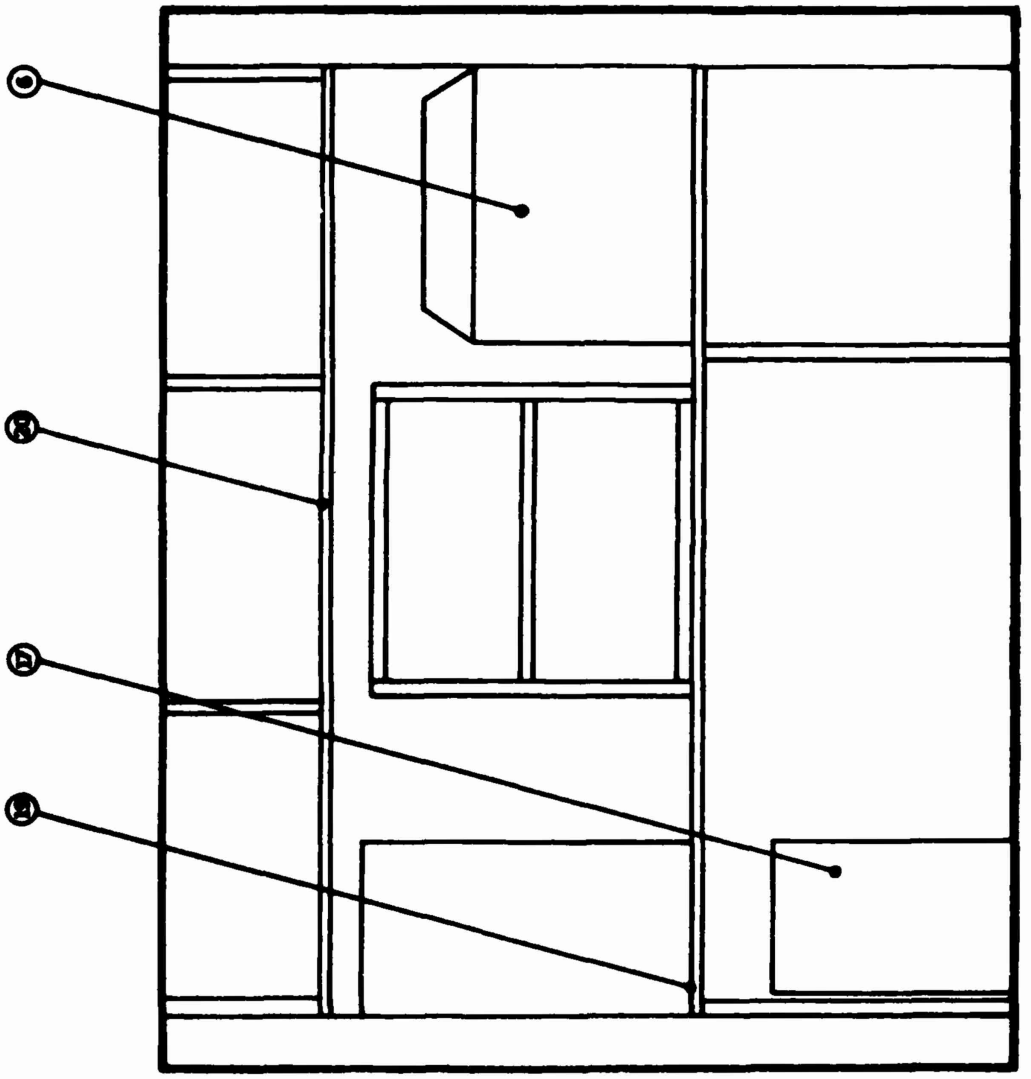


Figure B—10. Modular unit, front view (see item list)

3.5.11 **Lifting eye.** The modular facility shall be provided with four lifting eyes located at the four roof corners for lifting the modular facility. Each lifting eye shall be fabricated of 3/8" structured steel plate to be welded to each corner column with a continuous weld. The eyes shall project at a 45 degree angle to face of roof area and to be concealed from view by the mansard. The eyes shall be provided with 14" gussett plates to be used at corners with continuous weld to the panels angles. A 1–1/2" diameter hole shall be placed in plate as shown on Figure B–3.

3.6 **Electrical.** Food service equipment shall operate on a nominal 120/240 volt, 1- or 3-phase, 3-wire, 60 Hertz (Hz) system. Each electrical unit shall be supplied with a UL-approved power supply cord 6 to 6–1/2' long with a strain relief type appliance grip and a turn and lock plug in accordance with NEMA Standard WD 1. A 120/240, 1- or 3-phase, 3- or 4-wire, 60 Hz center 2/400 amp main disconnect and 30 branch circuits shall be provided for service to the modular facility. One outlet shall be installed in the modular facility for each piece of equipment 42" above the floor and centered behind the piece of equipment to be serviced. Each outlet to be on its own separate circuit and rated for the equipment it is to service. Wiring shall be piped in conduit and conduits shall be concealed in walls and ceiling, as applicable. All conduit shall be metallic with minimum size of 1/2". All conductors shall be copper with branch circuit conductors no smaller than No. 12 American Wire Gauge. Outlets installed in modular facility shall have a green colored pigtail to negative ground. All outlets wired must be UL rated and installed per NFPA 70 Standard. All other electrical component parts used in wiring including main distribution panel and breakers to bear UL ratings. Separate and apart switches shall be provided for interior lights, exterior lights, air curtain, heater/cooler unit, and exhaust hood fan. Main disconnects shall be provided and installed at the heater/cooler unit and exhaust fan. Each lighting fixture shall be wired independently and controlled by a single toggle switch located 42" above the floor at the door entrance on the left side, when facing forward. All flush plates shall be fabricated of stainless steel.

3.6.1 **Lighting.** Modular facility interior shall be provided with eight surface mounted rapid start fluorescent fixtures placed in the ceiling as required. Lighting shall be Keene Corp., Crescent Lighting Division, Pennsauken, NJ 08110, NG 240–IM w/2 F40 lamps and prismatic acrylic lens or equal. Modular facility exterior shall be provided with six, single socket, weatherproofed contemporary light fixtures – Source: Design Galleries, 325 N. Wells, Chicago, IL 60620, Factory No. 8599–34, Stock No. 66158 color white opal or equal. One light shall be placed at each side of the windows, left front corner, and at the right side of the rear door, when viewing forward. Each lamp shall be 150 watts.

3.6.2 **Motors.** Motor(s) used in the heating and ventilating system of the modular facility shall be of the continuous duty type, having permanently lubricated sealed bearings. Motors shall operate on a Nominal voltage furnished, yet compatible with requirements of 3.6.

3.6.3 **Electromagnetic compatibility.** The unit shall be designed and equipped for electromagnetic compatibility in accordance with class II of MIL–STD–461.

3.6.4 **Fungus and moisture resistance of electrical components.** Heating and ventilating system shall be treated to resist fungus and moisture as follows:

3.6.4.1 **Circuit elements** which have a temperature rise of not more than 75°F, when operating at full load, shall be coated with fungus-resistant varnish conforming to MIL–V–173. Circuit elements include but are also not limited to, cable, wire, terminal blocks capacitors, and coils.

3.6.4.2 Electrical components not requiring fungus-moisture resistance: Electrical components such as switches, fuses, and contacts, shall not be treated. Other materials and components which are inherently fungus-resistant or are protected by hermetic sealing need not be treated.

3.7 **Piping.** All water supply piping shall be 1/2" copper tube concealed in the walls. Vent and drain tubes shall be 2" in diameter black iron pipe or copper tubing with all connections sealed or sweated, as applicable, and concealed in the walls or floor with appropriate access panels for repairs. Vent and drain tubes shall be arranged not to interfere with the servicing or removal of components. Fittings shall be of wrought or forged copper. Where soldering temperatures will be deleterious to any adjacent fittings or component(s), the joint shall be soft soldered with solder conforming to the composition Sb5 of QQ–S–571 using flux conforming to type I of MIL–F–20329. Silver solder conforming to QQ–B–654 shall be used for making tube connections. Piping assembly shall be provided with shut-offs, stops, 1/2" water chamber, drains, etc. Water supply tubes, i.e., hot and cold water supply, when installed in conditioned spaces, in interior partitions, and under floor slabs shall be insulated. Drains from air handling unit, and duct heater unit need not be insulated. Water supplies and drains shall not leak when tested.

3.8 **Marking.** Identification markings and operating instructions shall be permanently marked directly on the item or an attached photosensitive, embossed, or engraved aluminum brass or stainless steel plate(s). The thickness of the plate(s) shall be a minimum of .012".

3.8.1 **Identification markings.** Each modular facility shall be permanently marked with the manufacturer's name, trade name or trademark of such known character as to be readily identifiable with said manufacturer.

3.9 **Operation.** Components shall be connected to applicable supply source in accordance with NEMA, NFPA, National Plumbing Code, and UL as applicable: (1) Electrical systems for electrical units shall maintain continuity from end to end without evidence of internal or external shorts during all operating conditions. All lights shall operate as intended and when tested all water connections and water supply lines shall not leak. All components shall operate and perform as intended when tested. All moving parts shall operate through one complete cycle without malfunction, binding or failure when tested.

3.10 **Repair and maintenance.** Provisions shall be made to allow for ready adjustment, service and replacement of components, valves, controls, and switches. In addition, there shall be free access to inspect, service, and adjust any component of equipment as provided for by this purchase description or as indicated by the component or equipment manufacturer, without disassembly of any other major component or equipment in the modular facility.

3.11 **Finish.** All components and assemblies of the modular facility shall be free from discolorations, rust, scale or stains. All damaged areas of shop coat of red oxide paint shall be touched up with the same paint used for the shop coat. Painted surfaces shall be free of runs, wrinkles, peeling, areas of no paint and film, not uniform and smooth. All exterior surfaces and interior ceiling shall be finished in white paint. All surfaces to be painted shall be primed in accordance with manufacturer's standard practice.

3.12 **Canopy.** A cloth nylon vinyl coated canopy shall be provided as specified. The canopy shall be of one piece and extend approximately ten feet from the modular facility. Reinforcing rods shall be incorporated around the edge of the canopy as well as stiffening rods to prevent the fabric from sagging. The canopy shall be secured to the roof line of modular facility and slope down towards sufficient 7' aluminum poles at the edge of the canopy. Sufficient guylines should be provided to insure restraint from excess wind conditions. The canvas shall conform to type II, class 2 of MIL–C–43006. The aluminum rods shall conform to QQ–A–200/9.

3.13 **Workmanship.** All components and assemblies of the modular facility shall be free from dirt and other harmful extraneous material, burrs, slivers, rough die, tool and grind marks, dents and cracks. Castings and molded parts if used, shall be free of sand, fins, pits, blowholes, and sprues. External surfaces shall be free from sharp edges and sharp corners.

3.13.1 **Metal fabrications.** Metal used in the fabrication of the modular facility shall be free from kinks. Forming and shearing shall not cause damage to the metal and shall be free from trimming marks.

3.13.2 **Welding.** The surfaces of parts to be welded shall be free from rust, scale paint, grease, and other foreign matter. Welds shall be smooth and free from cracks, burn holes, undercuts or incomplete fusion. All scale and flux shall be removed from the finish weld area.

3.13.3 **Fastening devices.** Holes punched or drilled shall be free of burrs. Threaded fasteners shall not be broken, cracked or stripped and shall be drawn tight. Rivets shall fill the hole completely and the heads shall be in full contact with the surface of the member.

4. GUARANTEE. The modular facility and equipment contained therein furnished under this purchase description shall be guaranteed against defective materials, design, and workmanship for a period of one year from the date of acceptance, either for beneficial use of final acceptance, whichever is earlier.

5. SUBMITTALS. Contractor shall submit manufacturer's brochures/shop drawings for all items listed in this section with sufficient descriptive information to indicate compliance with all specifications. Approval of submittals shall be obtained before purchasing items. Contractor shall also submit electrical schematic shop drawings for approval.

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